P.I. NEWS

TECHNICAL BULLETIN

The Pistachio Industry Newsletter • Volume 13 • June 2020

This 'Technical Edition' of *PI News* is prepared as one of the outputs of Project PS17002 - *Technology Transfer for Pistachio growers utilising regional grower Tech Groups & events.*

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NEW TECHNOLOGY:

Swiss technology works to increase growth, quality and health of melon crops (AND PISTACHIOS)

Many growers throughout the world have to use low-quality water for irrigating their crops. This might be because it is the only water available to them, or to save on costs. This low-quality water often has high levels of salt and this can be harmful to the crops as well as to the soil. Swiss company AQUA4D has developed a water-treatment technology that brings irrigation optimization, better water management and higher yields.

Open field versus greenhouse growing

The technology can be used by both open-field growers, as well as greenhouse growers. "We work for about 80% of the time with open field growers and we work with growers in more than forty countries throughout the world. The technology is the same whether it's for greenhouses or open field – we provide an ongoing consultancy service as well and discuss with the growers what issues they are looking to solve. Are they looking for less clogging, less salinity, or increased water savings? The system is then installed and used in a manner that is most beneficial for them," Thomas shares.

In Tunisia, AQUA4D is also used by greenhouse melon growers. A 2012 study at the Chott-Meriem Higher Institute of Agronomy looked at Citirex F1 melons in a greenhouse, testing specifically for resistance to nematode attacks, testing untreated water versus untreated water & nematicides versus AQUA4D treated water. It showed a 42% production increase, with nematode control more efficient than the chemical nematicides and reduced plant damage. In Spain, results found a +7.6% increase for commercial production in crops, and in Costa Rica, a grower saw a 94% decrease in nematode populations around the melon plants, as well as significant improvement in fruit quality and reject rates.

Thomas explains: "The technology is very simple to use, essentially 'plug-and-play'. The system is attached to the last stage of an existing irrigation setup, right before the water is applied to the crops. The efficacy of this water-smart technology has been proven with every kind of crop, whether it's melons, avocados, or almond and pistachio trees."

The full report can be found here.

INDUSTRY NEWS:

CROP:

With harvest over the 2020 crop was a good 'on-crop' of 2,850 tonnes. This is the second largest ever Australian crop behind the record 2018 crop.

The overall quality was good with most growers achieving only modest level of staining. The nut size is one of the smallest for many years creating some buyer resistance when they compare the small 2020 nuts with the 2019 crop which had the largest nut size for many years.

International prices are down a little due to the expectations of a record Californian crop in September. Consumption in Australia, and reportedly in world markets, remains healthy with no Corvid-19 downturn.

CHILL:

Currently the Chill hour accumulation looks positive with most regions ahead of many of the previous years.

The first PGAI Chill Hour Newsletter will be distributed to growers on the 30th June 2020

BENCHMARKING:

Growers supplying their crop to APPC should now have received their 2020 benchmarking report.

These reports are prepared by Dr Subha Abeysinghe utilising the data from APPC.

Growers are encouraged to review their results and look how they might make adjustments over the coming period to improve their overall results.

WEATHER REPORTS:

South Australians in the Riverland will have improved radar coverage following today's announcement that Mildura radar will be replaced, providing better weather technology to also Victoria and New South Wales.

Bureau of Meteorology South Australia State Manager, John Nairn, said, "Riverland farmers are about to see their skies open up on the radar."

For more detailed information you can find the full media release following.

PIT GROUP SESSIONS:

Due to COVID-19 and the restrictions put in place the conducting of face-to-face PIT group sessions have been difficult. The planned April/May sessions had to be postponed but we are working on a couple of Webinars as well as working on a program when the restrictions are eased.

Hope you all continue to receive good chill and plenty of rain.

Regards,

Trevor M Ranford
Executive Officer, Pistachio Growers' Association Inc and Project Leader for Project PS17002 - Technology Transfer for Pistachio growers utilising regional grower Tech Groups and events

Riverland set to benefit from new radar

South Australians in the Riverland will have improved radar coverage following today's announcement that Mildura radar will be replaced, providing better weather technology to also Victoria and New South Wales.

Bureau of Meteorology South Australia State Manager, John Nairn, said, "Riverland farmers are about to see their skies open up on the radar."

"Once the new radar is installed, coverage will extend west of Mildura into areas north and south of the Murray River, previously not covered."

"This is because the new radar will be in a better position and built around 45km west of Mildura in Cullulerainе."

"Riverland farmers will be able to see where rain is occurring and where severe storms are located on the radar. This will allow the agricultural community to track weather systems as they impact orchards, vineyards and other businesses. The radar will also verify damage caused by thunderstorms through a better storm watching capability."

"The new radar will also assist fire agencies in managing fire by monitoring plumes from bushfires."

This follows today's announcement from the Minister for Environment Sussan Ley that communities surrounding Mildura in Victoria, New South Wales and South Australia are a step closer to state-of-the-art weather technology, with the Bureau of Meteorology confirming it has signed the site lease for a new Mildura radar.

The 30-year old Mildura radar is located at the town's airport and is the second-oldest of the Bureau's more than 60 radars. The new radar will be built roughly 45km west of Mildura, in Cullulerainе.

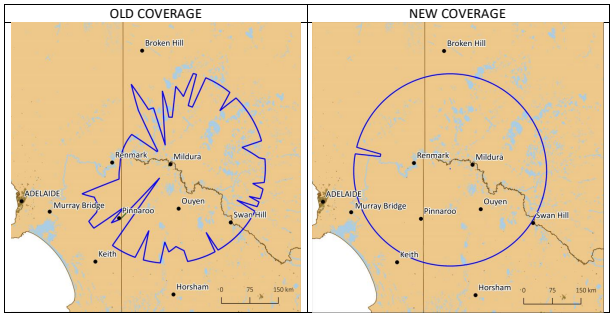
"Technological improvements will include Doppler capability and Dual Pol technology. This means we can measure not just where particles are in the sky, but also how fast they are moving and what kind of particles they are likely to be. It will detect rain drops, hail, bushfire plumes, rain intensity, and wind velocity - essentially, improved real-time weather services for the community," Minister Ley said.

The $5m replacement of the Mildura radar is being funded by the Australian Government and is part of a multi-year project to upgrade or replace the Bureau's entire radar network.

"I know how much regional communities depend on good weather information, and that's why we are undertaking this significant body of work to uplift the country's radar network."

"We are committed to supporting regional Australia and this new radar, along with the broader improvements of the country's radar network will be critical in helping businesses make better decisions and keep communities safe from the impacts of severe weather," Minister Ley said.

On current plans, the Mildura facility will be operational in early 2021, though the current COVID-19 restrictions are presenting extra challenges. As with a number of radar upgrades around the country, the Bureau will keep the community updated with all significant developments.



OVERSEAS NEWS:

USA:

Tree nut industry provides funding for more UCCE researchers

The California tree nut industry is helping to provide funding for four new research associates who will become part of the UC Cooperative Extension system. The addition of the new personnel is being made possible by the California Walnut Board, the Almond Board of California, and the California Pistachio Research Board who have contributed a total of $425,000 in funding support. Collaborations like this are one of the many ways that the UC system is able to support important agricultural research through alternative funding methods.

"By supporting these new positions in UC Cooperative Extension, the California Walnut Board, the Almond Board of California and the California Pistachio Research Board show their recognition for the value of applied research conducted by our nut crop advisors," UC Agriculture and Natural Resources vice president Glenda Humiston said in a news release. "We are grateful to these industry organizations for this vote of confidence and the generous funding to generate science-based knowledge to apply on California farms."

The funding support provided by the tree nut industry groups will cover the annual salaries and benefits of the new research associates, along with travel and equipment expenses. The agreement dictates that the new UC positions are to be funded annually for up to three years depending on the success of the endeavour and available funding. The primary function of the new staff research associates will be to assist tree nut advisors in the planning and execution of experimental and demonstration field trials, along gathering and compiling data associated with the projects.

The cooperative arrangement was developed to mirror a similar effort in Colusa County where the Almond Board provided financial support for an almond research intern to assist the local UC farm advisor in the area. With traditional funding sources from federal and state governments on a downward trend, creative partnerships between UC and industry groups become even more necessary to carry on important applied agricultural research.

That Billion Pound-Plus Crop of Pistachios is Maturing on the Trees

Jimi Valov is a pistachio grower in Kings and Tulare County. "You know, they always said 2020 was going to be a billion pounds. We'll make it this year. It'll be a billion pounds plus, and then we might possibly dip a little under it in 2021 but then even bigger in 2022 so yeah, I think they've been saying this for years. 2020 was going to be the billion pound and we're finally going to hit it."

And consumers around the world love California pistachios, but the industry must stay ahead of the demand. "Yeah, that's correct. We got to stay ahead of it. And that's why we need to always look a year or two, if not three years ahead of time tto make sure we have a home for our growing crop supply.

"You know, we had a little hiccup with the tariff, but somehow or another pistachios are getting the foreign markets anyway. And once people have California pistachios, it's kind of hard to go back to Iranian pistachios. So they're wanting them and the industry has places fro the to go I mean, we went to Europe and really opened up that market," Valov said.

And the country of India, they'd love California pistachios. "That's huge market, a huge market," said Valov. "But you know, everyone has their problems, but they say they don't have enough nuts, believe it or not. So, people ask me if we should keep planting. I wish they wouldn't keep planting. But you know, I just planted another 300.

FOOD SAFETY:

YouTube Food Safety Resources

Have you checked out the food safety resources on YouTube lately? At a time when we can't get to physical meetings, there's a wealth of resources available including APAL's interview with AHR's Dr Jenny Ekman on produce food safety, found here, or the New Zealand Food Safety Science Research Centre recording of a webinar on the Laboratory of the Ever-Nearer Future focusing on customer-led solutions on laboratory testing, with Dr Harry van Enckevort, Science and Technology Advisor at AssureQuality. The webinar also includes a presentation from Dr Tim Harwood, Deputy Director at NZFSSRC on rapid detection methodologies. More here.

ACKNOWLEDGEMENT:
Extract from *June 2020: Your Fresh Produce Safety Centre A&NZ Newsletter.*

LEAFING OUT ISSUES ON PISTACHIO TREES IN SOME AREAS

Leafing out problems, was it due to low chill or due to something else? Jimmy Nichols is general manager of Nichols farms in the Kings County area of Hanford, the company farms, almonds and pistachios.

He explained low chill in some areas. "We're currently in the shell expansion stage, But there are orchards, primarily on the West Side of the Valley and they look as though they have some low winter chill symptoms," Nichols said.

We asked Nichols what low chill looks like on those pistachio trees. "As of last week there were some trees that hadn't even leafed out or bloomed yet, both male and female," he said. "So it brought up a lot of memories of 2015 where the state crop was only at about I think 260 or 270 million pounds. In 2015 it seemed like the entire orchards were symptomatic. 2020 seems to be more variable as far as the symptoms go," Nichols explained

And of course this is supposed to be a billion pound crop for the pistachio season. We asked Nichols if this is going to impact that prediction. "It's certainly going to have an impact on the crop, but its was too early to tell," he said. "And we don't know how widespread the problem is."

In more news, it's recommended that growers be on the lookout for premature water stress. As we approached the hotter months of the season, the water demand could vary depending on the amount of rainfall received or the soil's water holding capacity.

PISTACHIO GROWERS WARNED ABOUT DUST DURING BLOOM

Mowing can kick up residues that interfere with pollination, advisors say.

Weeds in orchard row middles are out of control and need cutting - but flail mowing is no delicate task and blows dust into leafless canopies. Is irreparable harm done to fruit set?

Horticulturist Lu Zhang, formerly with University of California, Davis and now on staff at Oklahoma State University, is among a group of researchers who set out to determine if field dust injured leaf stomata and prevented photosynthesis while inhibiting pollen loading that resulted in poor pollination.

Because florets of both male and female pistachio flowers have fully exposed stigmas and anthers vulnerable to things like desiccating winds, they don't appreciate dry conditions and flail mowing during pollination is a culprit because of the dust generated.

"We set out to learn if dust on stigmatic surfaces reduced pollination and fruit set; if herbicide residue in the dust compounded the problem, and if the dust influenced pistachio nut growth. We wanted to determine if orchard dust harmed pistachio pollination, and if so, how," Zhang noted.

In the investigation, supported by the California Pistachio Research Board, they determined that "higher dust-to-pollen ratio, particularly dust-containing herbicides, could prevent successful pollination that in turn brought poor fruit set and nut quality."

To decrease the threat of dust interfering with pollination, it was recommended that windbreaks be planted - particularly in young orchards where spring winds were a perennial problem.

In more established tree groves, mowing during pollination becomes a non-recommended action. Instead, applying pre-emergent herbicides as early as possible before pollination was a recommended control measure.

Weeds among the trees

But what specifics apply to the problem of weeds among the nut trees? Richard Heerema, tree nut specialist at New Mexico State University, had some thoughts on that subject.

"There are orchard floor options available," he emphasized. "One way would be to maintain a completely vegetation-free floor using either herbicides or mechanical means. These are relatively easy approaches to use and they might allow you from having to do any mowing.

"Another approach involves herbicides in pre-emergent form as part of the herbicide rotation and that can be done before bloom as a spring application. My caution here is to make sure to follow the label of the particular formulation you're using because different pre-emergent herbicides are handled differently."

The struggle here is a balancing act between prevention and remediation; if you don't want to have to worry about battling weeds, try not to let them grow in the first place.

"Weed management differs between the trees and in the middle area, the length between the tree rows," he said. "Pre-emergent to prevent new weeds from growing is a possibility in the driving lane when you don't have vegetation on the orchard floor and can take equipment in before irrigation or the arrival of precipitation. It's always a balancing act."

If the long-term pre-emergent window of opportunity has passed for this season and blooms are already evident, Heerema has another suggestion involving drip system irrigation.

"With varied drip, you can reduce the amount of weed growth during that time period," Heerema said. "That's one way to manage the orchard during vegetation, but it also has its pros and cons as the non-weeded areas are actually more prone to throwing dust into the canopy. Like a lot of agriculture, it's all a balancing act."

MANAGING WASTE:

NUT INDUSTRY SEEKS TO PUT SHELLS TO GOOD USE

Almond, walnut, pecan and pistachio producers look for new ways to recycle waste.

The tree nut industry continues to think outside the box to find new uses for its discarded shells and hulls, be they almond, walnut, pecan, or pistachio.

Almond coverings were once used as livestock bedding, but that use is diminishing with reduced dairy demand. Pecan shells get loaded into ovens as fuel to cook potato chips for a snack food producer. Ground up nut shells are being added to recycled plastic dinnerware to increase utensil strength.

Nut hulls high in sugar content are being tested as a possible alternative for high fructose corn syrup or conversely as flavoring agents for beer. Walnut shells are ground up and sold as a polishing material for the burnishing of metals. Nuts with essential oils are ground and pressed into pellets to be used as fuel.

Depending on the kind of nut and the tree stock it came from, there may be numerous uses for the end or waste product. At least that's the way Eric McAfee of Aemetis Inc. in Cupertino, Calif., views the problem of mounting waste piles of nut shells.

As owner of a renewable fuels company, he told the 2019 Almond Conference his goal was to cease open burning of orchard waste by using technology to produce zero-emission fuels as replacements for petroleum-based products.

True to his mission, he is building the first biomass-to-ethanol plant on a 140-acre former Army munitions production facility near Modesto. He expected to open in late Spring, but plans have slowed down a bit due to the coronavirus, although his lease is signed and in place.

"We're in the final engineering phase of the project before actual construction gets underway," he says. "In the meantime, because we currently have the expertise to make alcohol, we're producing alcohol to be used in hand sanitizer and are starting to use unwanted orchard wood in that project," he says.

Focus on waste

Tree waste, whatever its form, is the focus here.

"We hope to be part of the solution of the current waste product issue, a solution that growers currently don't have. Right now, orchard waste sits in the field and they're stuck burning that waste on-site which creates air pollution. As this thing gets going, we hope to reduce the cost of removing orchard material, so it could be a cost reduction for farmers."

Part of his waste plant material fuel stock will utilize more than 2 million tons of ag waste produced annually in the Central Valley, much of it unproductive orchards and other woody waste to produce cellulosic ethanol.

"This is one of the largest air pollution sources in the Central Valley, which is, I believe, the second worst air quality region in the U.S., partly because some 3.2 billion pounds of wood gets burned every year - kind of like a big campfire burning year-round.

"By putting out that campfire, we improve air quality, an environmental benefit, as well as a financial benefit to growers because we're reducing the cost of removing their orchard, which currently runs something like $500 an acre or something crazy like that. That's a major cost to farmers who want to replace their orchards and we can help in mitigating that expense."

With some one and a half million acres of almond and walnut orchards in the state that have some 40,000 almond trees removed annually at the end of their average 20 year production lifespan - along with pistachio shells and hulls - he figures that will support production of hundreds of millions of gallons of cellulosic ethanol per year.

For more news on tree nuts as reported by growers and farm advisors, subscribe to the *Tree Nut Farm Press* e-newsletter.

Speaking of Science: The Science of Pistachio

"Every so often, grandma would take us to Howard Johnsons for ice cream. It was exciting seeing all of the flavors boasted on the mirrored wall as we'd sit at the lunch counter. My brother Glen, for some reason he's never explained, would get revolting black licorice and I, like Nana, sweet green pistachio. It was my favorite of all until I discovered its overseas cousin, the more complex and spunky spumoni.

Last week I sent away for some pistachio seeds - the planting kind, not the eating ones – you can get them anywhere, I thought perhaps I could grow a miniature pistachio tree in my house, much like a dwarf lemon or orange tree that some people have, and be able to grab a cluster of nuts fresh right from the tree when they bloom. They say this may take up to five years however.

Anyway, I know my cat, Cricket, would be happy, he goes crazy when I snack on them although, due to their fat content, they are probably not too good for cats to ingest. I limit his gluttony to only a few at a time.

Doing a little research on pistachios, I found the tree is actually a member of the cashew family, and originates from the Middle East, especially Iran. Archaeologists over the years have discovered that pistachio seeds were a common food as early as 6750 BC. It is said that The Hanging Gardens of Babylon, one of the Seven Wonders of the Ancient World, contained thousands of pistachio trees planted by King Nebuchadnezzar to please his wife, Queen Amylis, because she was homesick for the green hills and valleys of the city of her birth in Iran.

The pistachio tree was later introduced into Italy by the Romans about the time Jesus taught in Galilee and from there the tree was first brought to America in 1854 by Charles Mason, who distributed seed for experimental plantings in California, Texas and some southern states east of the Mississippi. After little success, a few more pistachio trees were imported from France and planted in Sonoma in 1875 but not much happened.

Wanting to move forward on a possible crop, the United States Department of Agriculture, in 1904, introduced hardier cultivars to California collected from China of all places but that didn't work either. It took until 1929 for this first commercial crop to come out but this was later limited by the Great Depression years after that.

Finally, 50 years later, in the 1970s pistachio nuts ramped up to full commercial status in California where they are now considered a good money making crop, along with almonds, macadamias and cashews. In fact, the demand for pistachio nuts has increased dramatically in recent years, from a paltry 4 million pounds in 1977 to over 980 million in 2018, making the United States the largest producer of pistachios in the world. Other major producing regions are Iran and Turkey and to a lesser extent, Syria, India, Greece and Pakistan.

The climate of the Central Valley of California is ideal for pistachio trees. They seem to thrive in areas that have cool winters and long, hot, dry summers since they cannot tolerate excessive dampness or high humidity.

Pistachios are dioecious with male and female flowers on separate trees and both trees must be present for fruit to set, meaning I would need at least two trees to get any fruit. It is said a branch from a male tree may be grafted on a female tree to accomplish the same effect but this sounds tricky. The small, brownish green flowers grow without petals and of course must be pollinated to get any seeds to grow.

The fruit, commonly known as a nut, is technically a drupe, where an outer fleshy part surrounds a single shell with a seed inside. When you buy pistachios from the grocer, you don't see the outer region, it has been already taken off.

Just for the record, both cherries and almonds are drupes because they have outer juicy parts. Normally the shells of the drupe split longitudinally along their sutures when mature and this is handy when eating them.

The color of the inner kernel varies from yellowish through shades of green, with the deeper the shade of green, the higher the value. Pistachio nuts are rich in oil, with an average content of about 55%. Trees begin bearing in five years, but it may take up to 20 years to get a full yield and, to make it worse, the trees tend toward biennial bearing, producing heavy crops one year followed by scant batches the next. As you could guess, the harvest is also influenced by drought, excessive rain, heat or cold and high winds.

The nuts are harvested by shaking the tree where sometimes a single shaking will bring down the bulk of the matured nuts which can be caught on a tarp or canvas spread out below. There are machines that grab the tree and shake it back and forth.

A fully mature tree may produce as much as 50 pounds of dry, hulled nuts. The hulls are mechanically removed and to enhance splitting, the bare nuts are then dipped into water to moisten the shell and lastly spread out in the sun on trays to dry.

The California Rare Fruit Growers have a website that claims the pistachio is unique in the nut trade due to its semi-split shell which enables the processor to roast and salt the kernel without removing the shell, and which at the same time serves as a convenient form of packaging.

They say about 90% of California pistachios are consumed as in-shell snacks. Shelled pistachios are utilized commercially in confectionery, ice cream, candies, sausages, bakery goods and flavoring for puddings. They are sometimes added to dressings and casseroles for flavor.

But getting already shelled pistachios takes the fun out of splitting them one by one."

ACKNOWLEDGEMENT: Gary Hanington is Professor Emeritus of physical science at Great Basin College and Vice President of Engineering at AHV. He can be reached at: garyh@ahv.com or gary.hanington@gbcnv.edu.

Hort Innovation
Strategic levy investment
PISTACHIO FUND

This project has been funded by Hort Innovation using the pistachio research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au