

The background of the entire page is a close-up photograph of several sweet potatoes. One sweet potato in the foreground is cut in half, revealing its bright orange interior. Another sweet potato is partially visible behind it, and a third one is in the background. The potatoes are resting on a wooden surface.

THE INNOVATION REPORT

2017-2018

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vineland
RESEARCH & INNOVATION CENTRE

Reflecting on a decade of success

A decade ago, the CEO of Vineland Research and Innovation Centre (Vineland) was holding in his hands a proposal for renewal and reinvention mapping out an exciting future for the former Vineland Research Station.

Today, he can take stock of remarkable accomplishments by a team of scientists, along with valued partners and collaborators, who make horticulture in Canada a sustainable industry.

Take the new Collaborative Greenhouse Technology Centre, one of the largest pre-commercial scale horticulture research greenhouse in North America. At one acre under glass, it's a testament to the tenacity of Vineland's leadership and researchers dedicated to fostering industry collaboration on innovation and commercialization.

"For example, knowing that the cost of production is the single biggest challenge for the industry... our work in automation is changing the channel and supporting the industry with new technology," Brandle said.

Genome Canada grants, the first of which came in 2014, were "the moment in time we realized validation of our scientific credibility," Brandle said. "A significant investment was made at Vineland to discover key genes in plant disease resistance, and to develop more flavourful tomatoes."

The launch of Vineland's first spin-off business, Platform Genetics Inc., is another feather in the research centre's cap. It allows plant breeders everywhere to access Vineland's Deep Variant Scanning platform, which has the power to quickly and inexpensively identify valuable genetic variations in plants.

There's also a new sweet potato variety bound to be a fan favourite which is set to take root on a commercial scale in 2019. The world crops program is feeding diversity by providing growers with opportunities to cultivate okra plus Indian and Asian eggplant for new Canadians.



Vineland's CEO Jim Brandle

And consumers wanting to sink their teeth into more local food have been snapping up Cold Snap™, a made-in-Canada pear available during the winter.

The real measure of success, however, has been seeing the fruits of Vineland's labour in orchards, fields, greenhouses and of course, in supermarkets.

"Those early days were spent assembling a team and putting a research program portfolio together to get where we are today, with a group of projects that deliver acres in the field and shelf space in the grocery store," said Brandle.

But he isn't resting on Vineland's laurels. Instead, he's taking stock of what's still to do, and it's a lot. He has visions of more greenhouse vegetables being grown in Niagara, where space under glass has typically been reserved for floriculture.

Advancing automation is another goal.

"We want to build the technology base for agriculture in the province and advancing automation and technology sectors is the way to do it. Building robots and developing the software to run them, there's lots of opportunities there," he said.

Focusing on innovative energy production and more consumer-driven plant breeding are also in store.

Admittedly, it will take commitment to get there. Still, looking back 10 years, Brandle said the research centre is doing exactly what it set out to do with the support of industry partners and collaborators.

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**Cover – Vineland's new sweet potato
variety set for market launch in 2019**

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New sweet potato variety suited to the Canadian growing season

A new version of one of the world's healthiest vegetables will soon be ready for large-scale commercial production in Canada thanks to scientists at Vineland Research and Innovation Centre.

The sweet potato variety, developed over the past five years with Canada's growing season in mind, will start taking root in farmers' fields by 2019, said Valerio Primomo, the research scientist leading the project.

It has big slips to fill. About 4,000 acres of sweet potatoes are required to meet current domestic demand.

Canadian growers have been cultivating Covington, a sweet potato variety commonly grown in the U.S. But Covington requires a long growing season – elusive in Canada – to develop its deep orange colour and avoid chilling injury.

Still, there's a market for locally grown sweet potatoes that's not being satisfied by the current 2,000 acres primarily in southern Ontario. The average person eats about 1.5 kilograms of the orange vegetable every year and that's mostly from imports.

"The intent is for this work to increase production across Canada," Primomo added.

Vineland's search for a sweet potato suited for Canadian production got some help from Don Labonte, a sweet potato breeder at Louisiana State University's AgCenter.

Labonte is known for breeding high-yielding and top quality versions of the root vegetable and produces 40,000 seeds a year through cross-pollination.

He provided Vineland with 2,500 untested hybrid sweet potato seeds that Primomo grew in an effort to find the sweetest one of all for growers, processors and consumers.

"That's breeding. You start with a large population and narrow it down," Primomo said. "You compare the 2,500 to the standard and hope that one will come out better than that."

Primomo screened the candidates that sprouted from the first plantings of Labonte's seeds, looking for those with the dark orange flesh sought after by fresh market consumers.

Once his selections were made, Primomo took cuttings from the chosen ones and planted them at Vineland. At harvest, he cast a critical eye on the sweet potatoes' shape and colour, culling those that didn't stand up.

The remaining candidates were whittled down based on sugar and dry matter content, yield and consistency of shape and colour.

Primomo has been striving for a U.S. No. 1 grade with his sweet potato progeny. Anything too big or too small is destined for bagging, or baby or pet food, and won't provide the sweet returns growers are after.

He also considered how skin held up to harvest and how well the final few selections fared in storage when deciding which varieties to carry forward.

The sweet potatoes still in the running were grown on two Ontario farms and one in Nova Scotia to see how they stood up. The three best performers were propagated and then tested in locations throughout Canada, providing Vineland with a frontrunner.

The top candidate matures well in a short growing season and significantly outyields Covington, Primomo said. It even has Covington beat in colour and the flavour is a winner with consumers.

Vineland's marketing team is working on naming this sweetest sweet potato, currently known as VSP445. In the meantime, Primomo isn't casting off the other shortlist members. They may be exactly what some growers are after.

"You can't get all the attributes in one selection," he said. "They may have to be spread over several varieties. Then it's up to the grower. It will ultimately depend on the market they supply."



...The intent is for this work to increase production across Canada."



The potential of sweet potato propagation

Canadian sweet potato growers not only will benefit from Vineland's development of a new variety of the root vegetable, plant propagators also stand to gain by meeting farmers' demand for planting material.

Currently, Canadian sweet potato growers rely on U.S. slip propagators to provide planting material each season. But availability of slips and timing of delivery can be an issue, delaying the start of an already short growing season.

Enter Viliam Zvalo, a vegetable production research scientist at Vineland, who is developing an efficient slip production system for Canadian propagators focused on Vineland's new sweet potato variety.

Sweet potato slip production happens in early spring, he said — a time when greenhouse space is often at a premium. However, some have capacity to take on another crop, and sweet potato slips could be it.

"There will be growers who specialize in certified sweet potato seed and others will focus on slip production in a heated greenhouse," Zvalo said. "In some cases they may do both."

Better still, Vineland's new sweet potato variety has high propagation rates compared to other varieties.

"Our research indicates that 500 to 600 slips can be harvested from one square metre in one cutting, and growers can count on two crops of slips from a single planting," Zvalo said.

"It's vigorous enough to produce a bounty of slips. I'm hopeful growers will embrace this business opportunity and grow the industry in Canada."

It will take three years, starting from tissue culture, to produce two generations of certified seed and enough slips to satisfy demand from Canadian commercial sweet potato growers. That pushes the launch of large-scale production of Vineland's new sweet potato variety to 2019.

To meet that deadline and supply the maximum amount of slips, Zvalo is experimenting with both

single node cuttings and traditional slips for sweet potato seed production.

"It obviously boils down to producing enough planting material at a competitive price," Zvalo said. "I'm really optimistic about slip production in Canada, especially when we use innovative plant propagation methods to achieve high multiplication rates."



...It's vigorous enough to produce a bounty of slips. I'm hopeful growers will embrace this business opportunity and grow the industry in Canada."



Charles Keddy from S S Keddy & Sons Ltd, a Nova Scotia-based sweet potato grower, and Viliam Zvalo, Vineland's research scientist, vegetable production



Orange sweet potatoes golden for consumers

When it comes to sweet potatoes, looks matter most for consumers.

Anything less than vibrant orange flesh leaves them seeing red, no matter how well the vegetable tastes.

That was among the findings of Amy Bowen, Vineland's consumer insights research program leader. Bowen put the leading candidates from the research centre's sweet potato breeding program up against top commercial varieties to determine those most likely to wind up on dinner plates.

Colour was key for consumers, she found. They sampled sweet potatoes as fries, baked and puréed over the course of a two-year study to see how the top candidates stood up to taste buds.

"It was a bit surprising but colour was the most important attribute," Bowen said. "They expected (fries) to be bright orange and look crispy."

Any brown bits caused by the caramelization of sweet potato sugars while cooking left consumers with the impression the fries weren't prepared properly or were dry.

Colour, texture and taste were paramount when participants sampled baked versions of the sweet potatoes. Firm and sweet options were preferred.

"If the sweet potato had any kind of bitterness or earthy flavour, consumers didn't like it," Bowen said. "Colour was still important, though. The majority of consumers are expecting that bright orange, uniform colour."

When it came to puréed sweet potatoes, participants favoured those that were moist and had caramel aromas.

One selection stood out through it all, determining the first variety for release. It will be ready for commercial production in 2019.

The versatile winner turned heads at the 2017 Canadian Produce Marketing Association (CPMA) Convention + Trade Show when prepared as potato chips, a test product developed with the help of Niagara College's Canadian Food and Wine Institute.

"Conference attendees loved them and thought the chips were a fantastic product," Bowen said.





...The majority of consumers are expecting that bright orange, uniform colour."

Vineland's VSP445 sweet potato variety



Asian long eggplant



Indian round eggplant

“...It’s always a challenge to go with something new but...we have good data to support Canadian farmers.”



Cracking the code on eggplant production

Viliam Zvalo can talk a purple streak about eggplant, especially if they're Asian long or Indian round varieties.

The research scientist at Vineland Research and Innovation Centre (Vineland) has spent the past three years working closely with both, figuring out their idiosyncrasies when grown in fields and greenhouses in hopes of making them seem less foreign to Canadian growers.

"It's always a challenge to go with something new but as the research component of this program comes to an end, we have good data to support Canadian farmers," Zvalo said.

His efforts to shine some light on the nightshades is part of Vineland's world crops program, launched in 2010 with the goal of finding ethnocultural vegetables that can be grown here.

Zvalo found the best varieties of Asian long and Indian round eggplant to produce locally, how best to grow them, and just how much can be produced in the right conditions.

Take the Indian round eggplant. The plants producing small, purple ball-shaped versions of the vegetable thrived in the field.

"There's no issue with production in the field," Zvalo said. "But it doesn't really like the greenhouse."

By contrast, Asian long eggplant that Zvalo tested, including the dark purple Japanese variety Orient

Express and a brighter purple Chinese type, not only did well in the field but showed promise in the greenhouse.

The key to high field yields with both Indian and Asian varieties, he noted, was grafting the eggplant onto tomato rootstock. He also discovered non-grafted eggplant grew best under row covers since perforated plastic created too much heat for the young eggplant to bear.

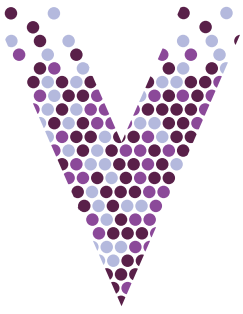
One key difference between Asian long and Indian round varieties in the field is the need to grow the former in a protected area as they are susceptible to wind damage and require fencing for stability and to maintain high yields.

There are still some unanswered questions about these world crops grown under glass. Producing eggplant in greenhouses isn't done anywhere else in the world, so there's opportunity to learn more.

"Growers can easily achieve up to 42 kilograms of fruit per square metre," Zvalo said. "By experimenting with different plant spacing in the greenhouse, we hope to fine-tune production of dark-skinned Japanese long eggplant to increase yield without sacrificing fruit quality."

"It will be up to the greenhouse industry to see the potential and grow this opportunity," he added. "Much like our research on world crops in the field created the impetus for growers to supply locally grown Asian eggplant to retail outlets, the possibility of year-round greenhouse production is an exciting next step."





Okra proves A-OK for Canadian growers

It's far from Canada's largest crop.

In fact, for years okra production barely registered here. But one Vineland research scientist has worked to move the cylindrical green vegetable, also known as Lady Fingers, from the fringe to the forefront.

Viliam Zvalo has spent the past three years investigating how to grow okra in Canada as part of Vineland's world crops program, an initiative to find new and profitable crops for local farmers to grow for new Canadians seeking the flavours of their native lands.

Okra consumption in Canada is on the rise. In 2016, more than 6.5 million kilograms of the vegetable were imported to feed our hunger for okra — a number that's increased 26 per cent in the last five years. But grocers want to carry more local harvests and it's anticipated demand will only increase if high-quality offerings are grown closer to home.

Zvalo knows the ins and outs of getting the most okra per acre, the best varieties to grow and just about every other secret to success in okra production. And growers are taking note.

"We're getting a lot of calls," Zvalo said about interest in okra. "If growers want to explore it, we'll provide the seeds."

Zvalo has pinpointed four varieties of the sub-tropical vegetable that fare well in Canada's shorter growing season. He focused his search for prime candidates on high-yielding, fast-growing hybrids, including darker green, slender okra appealing to South Asian consumers, and gumbo varieties commonly used in southern U.S. and Caribbean recipes.

Zvalo evaluated direct seeding versus transplanting to see which method was most fruitful. He found direct seeding yielded, on average, about 20 per cent less okra than transplanting. In general, direct-seeded okra was also ready for harvest two to three weeks later than when transplanted.

He also determined growing plants on raised beds in double rows 30 centimetres apart and with similar in-row spacing is best for achieving high yields.

"We now have enough knowledge to share with growers for them to grow it," he said.

Zvalo shares okra seeds with a caveat, though: start small.

"Look at the crop and see how it fits in with your business plan," he said.

Okra is labour-intensive, typically requiring one person per acre to harvest daily, starting in mid-July and continuing into fall. Okra plants can also grow to more than two metres tall by the end of the season.


Zvalo will connect growers to retailers if they're keen to expand production after trialing the crop.

Meanwhile, his efforts convincing growers of okra's merits are paying off. About 60 acres were grown throughout Canada in 2016. Zvalo has shipped seeds to as many as 30 farmers across the country with okra gaining the most ground in Ontario, British Columbia, Manitoba and Quebec.

Some might say that number is small potatoes. Zvalo would say otherwise.

"To me, we are sowing the seeds of success."



A close-up photograph of several green okra (ladyfinger) vegetables. The okra are bright green, elongated, and have a slightly bumpy texture. They are arranged in a cluster, with some showing the stem and leaf attachments. The background is dark and out of focus.

*... We now have
enough knowledge
to share with growers
for them to grow it."*



The scent of opportunity

“...Participants talked about how the smell reminded them of home. It's very nostalgic.”

Vineland's world crops program is blossoming.

The initiative bringing okra, and Asian and Indian eggplant to local growers has inspired new research aimed at ethnocultural potted plants and flowers.

Think jasmine and lotus, those exotic blooms common to a part of the world from which a large number of new Canadians come.

“It's an off-shoot of world crops. If we can do it with food, can we do it with flowers?” said Alexandra Grygorczyk, a research scientist at Vineland and project lead.

Researchers chose jasmine as the first plant to commercialize after a lengthy selection process. It involved online focus groups of new Canadians who identified over 30 varieties of plants they were interested in purchasing.

Results were whittled down by surveying more than 700 Asian Canadian consumers to determine which of the 30 frontrunners held greatest appeal. *Jasminum sambac*, often referred to as Arabian jasmine, was the top candidate, one that consumers could easily purchase in many areas back home but not in Canada.

Once it was identified, Vineland worked with consumer focus groups and conducted a follow-up survey to find out which jasmine cultivar they preferred, what shape the plants should have and even how they perceived the plant's personality to assist with future marketing efforts.

"There was a fire in their eyes. They were so excited to talk about these plants," Grygorczyk said. "Many of the Asian participants knew so much about them."

Admittedly, the winner, Arabian jasmine, is no great beauty. It has small, simple white flowers and abundant foliage.

But what it lacks in appearance it makes up for in smell and significance. It's a common fixture at Hindu weddings, Hindu and Buddhist prayer offerings and other auspicious celebrations.

"The main attractant is aroma," Grygorczyk said. "The flower is embedded in many Asian cultures. It has religious, spiritual and cultural significance in many regions. Back home jasmine is everywhere. Participants talked about how the smell reminded them of home. It's very nostalgic."

It's also very lucrative. South Asian Canadians living in the Greater Toronto Area spend \$60 million on cut flowers and potted plants every year.

Producing potted jasmine here provides a new opportunity for Ontario's greenhouse flower growers who have lost cut flower market share to imports, Grygorczyk explained. "Our growers can compete within the potted plant market more effectively since countries exporting to Canada have a difficult time getting their potted plants across the border."

Jasmine also fills a void for greenhouses that operate below capacity during the summer. Not only is it a slow time for sales, it's often too hot for plants to thrive under glass at that time of year.

Tropical plants like jasmine can thrive when the mercury soars, and be ready in time for Diwali, the Hindu festival of lights celebrated in the fall in the northern hemisphere.

"The timing is perfect. It gives growers something to fill their greenhouses without competing with their other crops," Grygorczyk said.



Jasminum sambac, often referred to as Arabian jasmine

Vineland partnered with Westbrook Floral in Grimsby, ON on a small release of potted Arabian jasmine that was sold at Longo's grocery stores in spring 2017. The family-run, Greater Toronto Area supermarket chain is the first to buy into Vineland and Westbrook's efforts.

Plans are in the works to do a larger release in Longo's stores. If all goes well, the scent of jasmine could smell like success to other growers, who could add it to their repertoire as well.

"We do expect there's a market for it. South Asians, especially Hindus and Buddhists, typically buy more cut flowers and potted plants than the average North American consumer," Grygorczyk said. "Flowers are a much bigger part of their culture and celebrations."

Vineland is setting its sights on other ethnocultural plants that could provide growers with new and profitable markets.

Bowl lotuses, which are miniature versions of the plants grown indoors, are good candidates.

Cut lotus may also present a good opportunity since it is currently imported to Canada through specialty florists and doesn't always arrive in the best condition. "We're going for quality. That's our market advantage," said Grygorczyk.





Gene miners: Meet PGI, Vineland's first spin-off company

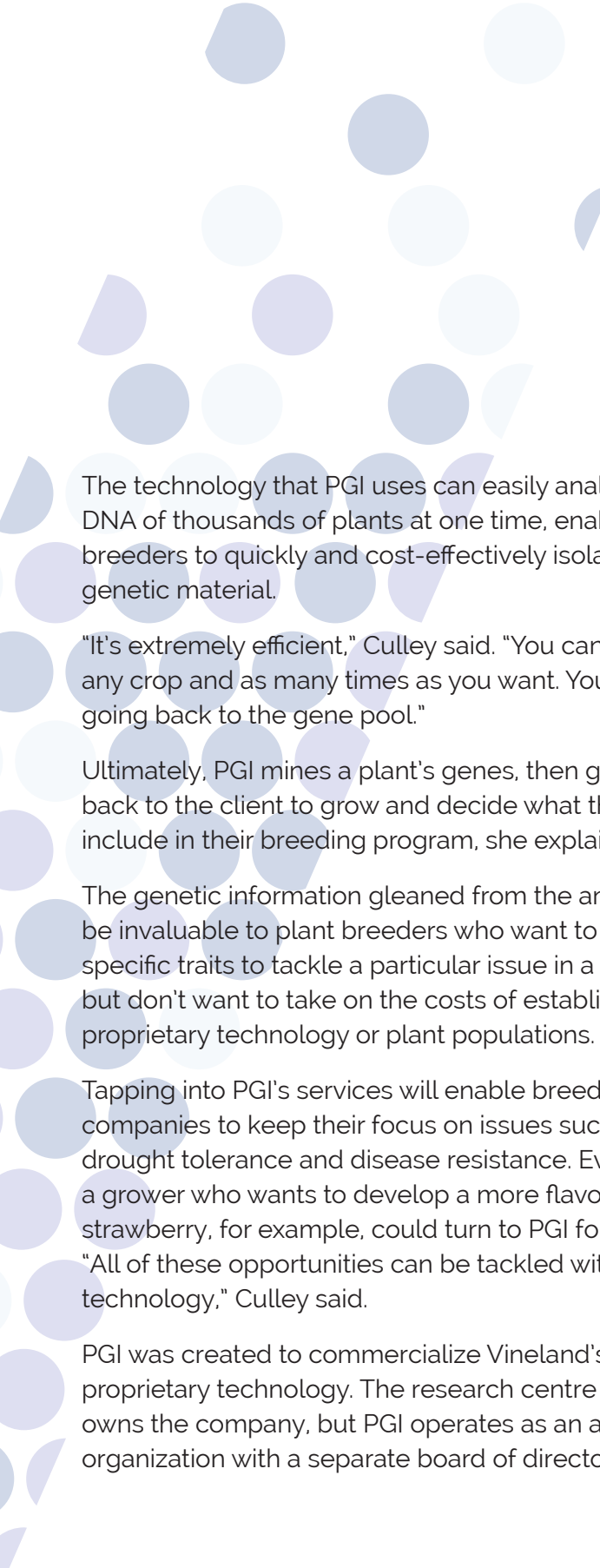
Another shingle has been hung at Vineland Research and Innovation Centre.

Platform Genetics Inc. (PGI) is the latest endeavour to set up shop on the research centre campus. It's also Vineland's first spin-off business, offering private enterprises, including breeding companies, the chance to tap into its reverse genetics expertise and technology to improve crops.

Vineland has been using its patented Deep Variant Scanning (DVS) technology in several of its own breeding programs, including those focused on developing flavour in greenhouse tomatoes, and disease resistance in other crops.

But other organizations have asked to utilize the potential of the genomics/bioinformatics platform for their own needs. With 10,000 breeding companies in Europe alone, PGI's potential was impossible to ignore.

"This is a large opportunity," said Lana Culley, Vineland's director of business development. "It has application in virtually every crop. This was an opportunity to create a spin-off company that would meet an industry need without distracting Vineland from its core business."



The technology that PGI uses can easily analyze the DNA of thousands of plants at one time, enabling breeders to quickly and cost-effectively isolate desired genetic material.

"It's extremely efficient," Culley said. "You can use it on any crop and as many times as you want. You can keep going back to the gene pool."

Ultimately, PGI mines a plant's genes, then gives seed back to the client to grow and decide what they want to include in their breeding program, she explained.

The genetic information gleaned from the analysis can be invaluable to plant breeders who want to develop specific traits to tackle a particular issue in a crop, but don't want to take on the costs of establishing proprietary technology or plant populations.

Tapping into PGI's services will enable breeding companies to keep their focus on issues such as drought tolerance and disease resistance. Even a grower who wants to develop a more flavourful strawberry, for example, could turn to PGI for help. "All of these opportunities can be tackled with this technology," Culley said.

PGI was created to commercialize Vineland's own proprietary technology. The research centre currently owns the company, but PGI operates as an autonomous organization with a separate board of directors.

Vineland partnered with Bioenterprise, a non-profit business accelerator in Guelph, ON; local incubator Innovate Niagara; and MaRS, a Toronto, ON-based technology commercialization firm, to explore the start-up opportunity and launched PGI in late 2016.

The venture fulfills the research centre's mandate of economic growth and job creation. Culley expects the company's clients to be predominantly international, given most plant breeding happens outside Canada.

Still, exporting technology and attracting international clients to do business in Ontario is a boon for the domestic economy. And the work PGI does could one day benefit Canadian growers, she noted.

"It's like Canada providing a value-added service. The varieties that PGI will enable are likely to come back to Canada for the benefit of growers and ultimately consumers", Culley said.



...It has application in virtually every crop."



Mini-cuke packer promises big changes

Forget chocolate bars with oozy caramel filling. Vineland Research and Innovation Centre (Vineland) has been busy solving the mystery of getting mini cucumbers onto a tray and packaged as efficiently as possible.

The answer: an automated process that can grade, align and pack the snack-sized cucumbers at a rate of 300 trays per hour.

That's roughly twice as fast as the method currently used in most greenhouses growing the diminutive vegetables.

The fast-moving machine uses a series of conveyors, a speedy pick-and-place robot, and optical sorting to grade the cucumbers by size and shape.

Once the best of the bunch are chosen, the device organizes the gourds so they line-up.

It also arranges those with a slight curve so they nest neatly on a tray before being wrapped in cellophane and shipped to grocery stores.

"It seems like such a simple thing, but this is an exciting project utilizing a lot of technology," said Darren Ward, Vineland's manager of business and commercialization.

The machine is designed to work with automated graders that growers already use in their greenhouses. It can also be built to accommodate operations that rely on manual grading, using a hopper to load the mini cucumbers in bulk.

"Bigger facilities have graders so this enables them to extract more value from

their grader," Ward noted. "For smaller facilities, the 'dump and go' method works for them."

Many growers currently rely on manual labour to get their crops ready for market. That method can be expensive and inefficient in an industry already trying to stretch narrow profit margins.

The mini-cuke packer does it all in a "simple, elegant way," Ward noted. It's affordable for small- and large-scale operations and cost-effective. The machine pays for itself in about two years, he explained.

Vineland is working with CMP Automation in Ayr, ON to finalize designs and build the machine.

The first edition is expected to roll off the line in 2018 and is destined for AMCO Produce in Leamington, ON which packages its Select One line of mini cucumbers six pieces to a tray.

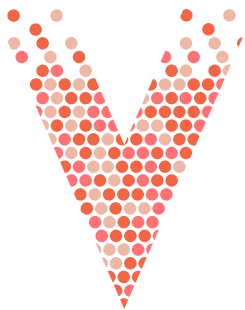
"They're an ideal first customer," Ward said. "Their current workflow is adaptable for automation. And they're excellent to work with."

The technology is bound to catch on from there. Mini vegetables are set to enjoy huge popularity as consumers become more health conscious and seek on-the-go snacks requiring little preparation to enjoy.

There's an opportunity to export the Vineland-created, CMP-built technology, too, given the tray is the preferred method of packaging and marketing No. 1 mini cucumbers in Canada and the U.S., Ward added.



...It seems like such a simple thing, but this is an exciting project utilizing a lot of technology."



Scouting program proves fruitful

Consumers' fruit bowls will soon be a little fuller thanks to Vineland Research and Innovation Centre.

Vineland has scouted new varieties of table grapes and apples that are showing promise with growers and consumers alike.

Having more fresh grapes for local farmers to grow will expand offerings currently ruled by Sovereign Coronation, said Sarah Marshall, manager of the Ontario Tender Fruit Growers.

The blue grape has proven popular among older consumers and in Quebec, she noted. Problem is, it's only available for four to six weeks a year, limiting the availability and range of locally grown grapes to consumers throughout Canada.

"There's a lot of shelf space for grapes and since Sovereign Coronation is only available for a short time, there's opportunity to explore other flavour profiles to meet market demand," Marshall said.

One candidate with an otherworldly name could one day occupy some of it. The Jupiter grape is one of several varieties imported by Vineland's technology scout, Michael Kauzlaric.

Vineland is growing the grape, developed at the University of Arkansas, on a trial basis to determine its potential with growers and consumers.

So far, the seedless blue grape shaped like a jelly bean is a winner. It has a distinct flavour and isn't watery like some grapes, Marshall said. It also ripens after Sovereign Coronation, extending the availability of local grapes into October.

Vineland has signed a licensing agreement with the University of Arkansas to work with Canadian nurseries on propagating vines. With funding from the Ontario Tender Fruit Growers, the research centre has been testing varieties from Arkansas in its vineyard since 2014.

Jupiter is anticipated to land in grocery stores in 2022. In the meantime, consumers will be polled on choosing a bilingual name that's not as far out as its current moniker.

"I'm curious to see what names people come up with," Kauzlaric said. "There seems to be a lot of excitement in the fresh grape world."



Michael Kauzlaric, Vineland's technology scout & grower outreach





“...There’s a lot of shelf space for grapes and since Sovereign Coronation is only available for a short time, there’s opportunity to explore other flavour profiles to meet market demand.”

Early summer Jupiter grapes

*...People
who think
they don't
like apples
will love this
product."*

By 2022 consumers could also become enamoured with a new apple.

Smitten™ is the first variety scouted by Vineland that's ready for commercialization in Canada.

Scouting speeds up the process of getting new fruit to growers and consumers because it brings in already finished varieties from around the world. Breeding, by contrast, starts from scratch and can take at least 15 years from initial research to commercialization.

Vineland brought Smitten™ into Canada and launched a multi-site testing program across the country in 2013 with industry partners.

The research centre then brokered licensing deals between Pegasus Premier Fruit, the Washington-based company that holds the North American marketing rights to Smitten™, and two interested Canadian growers/marketers.

Randy Steensma and Barclay Crane – owners of Pegasus – played a leading role in the commercialization of Honeycrisp™ as well as Jazz™ and Pacific Rose™.



"Honeycrisp™ and other club varieties have gone on to fundamentally change the way consumers look at the apple category. Pegasus believes Smitten™ is the next chapter in this paradigm shift – an extraordinary eating experience," said Crane.

"People who think they don't like apples will love this product," he said.

Vineland fast-tracked Smitten's™ introduction to the Canadian market, making the relationship between the two organizations invaluable, noted Crane.

An early yellow apple is also in the running for room in orchards and space on supermarket shelves.

Vineland began scouting the world for new varieties in 2010 after meeting with the Ontario Apple Growers, who indicated interest in producing new yellow apples.

One particular early yellow variety developed in Europe was a standout in trials because of its flavour, red blush and storability – a particularly promising trait. "For a summer apple, it has legs and stores well,"

Kauzlaric said. "You couldn't keep the early-picking and popular Ginger Gold® that long."

The first trees were planted at Vineland in 2013. The variety is currently being tested throughout Ontario, Quebec, British Columbia and Nova Scotia.

How it fares this growing season, and in taste tests with the Ontario Apple Growers and other industry representatives, will determine whether the apple is destined for commercialization in Canada.

If all goes according to plan, Vineland will seek expressions of interest from growers and marketers who want to be the first to plant the apple on a large scale.

"There's always a risk with importing varieties and spending five years with them," Kauzlaric said.

"There's no sense managing a variety if tree sales are limited. The scouting program offers the industry great insight on new varieties and fast-tracks opportunities for growth."



Smitten™ apple



“...There aren't many roses of this colour targeted for cold hardy areas.”



Stars align for Chinook Sunrise™

It's the kind of rose that's bred to impress.

A rose that can stand up to the cold of Canadian winters, balk at disease and look stunning all the while.

Meet Chinook Sunrise™, the newest bloom in Vineland's 49th Parallel Collection. The coral-coloured blossom succeeds Canadian Shield™, the successful first release in the made-in-Canada line of garden and landscape roses.

Vineland's 49th Parallel Collection is the product of a national rose breeding program established at Vineland in 2010 in partnership with the Canadian Nursery Landscape Association (CNLA).

Chinook Sunrise™ was the bright light among candidates in the running for a follow-up release because of its warm hues, not unlike its namesake.

"It strays from the usual deep pink and red shades currently in the Canadian marketplace," said Parminder Sandhu, a research scientist in ornamental breeding at Vineland.

"You don't see much colour variation in those roses and Chinook Sunrise™ is different," Sandhu added. "It's a beautiful coral rose and as days get warmer its colour changes. The beauty is, as it changes, it turns pink, so you get two different colours with the bud remaining deep coral."

Chinook Sunrise™ grows to a 1.2 metre spread. It's a bush rather than a climber, boasting shiny, glossy green foliage to contrast against its fair blooms, Sandhu noted.

And it carries on the legacy of Canadian Shield™, withstanding winter temperatures as low as -40°C. It's also tolerant to rust, powdery mildew and black spot and will appeal to both new and experienced gardeners.

It took six years of breeding and testing for Sandhu to see how much of a shining star Chinook Sunrise™ really is.

The rose was bred in 2011. In 2013, it was selected with 22 other hybrids for advanced testing in locations across Canada. Cuttings were then propagated and sent to testing sites to see how it would fare in the climates of Alberta, Saskatchewan, Manitoba, Quebec and New Brunswick as well as the varied growing zones of British Columbia.

The hybrids were evaluated for winter survival, disease tolerance and plant performance. Chinook Sunrise™ rose to the task of surviving and thriving in different regions of Canada.

Consumer panels also took a shine to Chinook Sunrise™ when compared to the top-selling roses currently on the market. Panel participants reported the rose's appearance evoked positive emotions, including feelings of calm, warmth, happiness. More than 40 per cent said Chinook Sunrise™ made them feel peaceful.

The new rose has big roots to fill when it's released in 2019 and Sandhu is confident Chinook Sunrise™ will be a hit.

"There aren't many roses of this colour targeted for cold hardy areas," she said. "It's the perfect addition to Vineland's 49th Parallel Collection."



Parminder Sandhu,
Vineland's research scientist,
ornamental breeding



Rooting for success with RootSmart™

Rick Bradt, managing director of A.M.A. Plastics (A.M.A.) in Kingsville, ON has seen what air currents can do to an orchard. Trees loaded with a crop standing tall one day and toppled over the next, giving in to gusts that blow through their heavy branches.

The problem has nothing to do with what is in the air. It starts below ground with poor root structure tracing back to when trees are propagated at the nursery.

Trees are typically grown in containers causing roots to drive down through soil substrate until they reach the walls and bottom of the propagation tray. With nowhere left to go, they circle around each other into a tangled, unstable mess.

It is a longstanding industry conundrum and Bradt was determined to finally crack it.

The solution was rooted in a partnership between A.M.A. Plastics, which has distributed propagation containers for the horticulture industry for 35 years, and Vineland Research and Innovation Centre (Vineland).



Rick Bradt, managing director,
A.M.A. Plastics

Bradt and A.M.A. Plastics were looking for research supporting new propagation tray structures capable of producing generations of healthy trees. Meanwhile, Vineland's nursery and landscape research scientist Darby McGrath was looking for an industry partner to develop such a concept.

"The goal is to end root girdling or circling in tree propagation," Bradt said. "There isn't really a good solution in the marketplace to end this critical problem."

The new propagation containers also cannot add to growers' labour costs and need to be recyclable.

With this in mind, McGrath and Vineland came up with prototypes after studying 14 different trays already on the market and their effects on roots. The Vineland team worked closely with A.M.A. over three growing cycles to come up with the winning concept.

RootSmart™, a wall-less, bottomless propagation tray, is set to be unveiled January 2018 at the Landscape Ontario Congress.

The innovative propagation tray meets all the requirements Bradt and crew set out to achieve, including limiting labour costs. It's being used in trials in Ontario and California, with the potential to be marketed worldwide by A.M.A., which holds the exclusive production and marketing licence to RootSmart™.

"Everyone in the industry knows about this problem and we wanted to find the solution," Bradt said. "Whether RootSmart™ is perfect or not, is for the industry to decide. What we're offering is an innovative and cost-effective product to address a longstanding problem."



It's a solution that wouldn't have come as quickly or inexpensively without Vineland's help, he noted.

Other tray designs have been developed without the benefit of research because it can take too long or be costly, Bradt noted. A.M.A. could have tried tackling the science itself but then it would need to find designers to create something tangible.

Instead, Vineland researchers came up with the idea for RootSmart™ and helped A.M.A. bring it to life.

"I don't know what we would have done without our Vineland partnership," Bradt said. "They were able to do the research and recommend a winning innovation for the industry."

...The goal is to end root girdling or circling in tree propagation."



With a highly-skilled research team, oversight from an independent Board of Directors, engagement from an international Science Advisory Committee and collaboration with more than 160 global partners including a Stakeholder Advisory Committee, Vineland's goal is to enhance Canadian growers' commercial success through results-oriented innovation.

We are an independent, not-for-profit organization funded in part by *Growing Forward 2*, a federal-provincial-territorial initiative.

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