HORT SNACKS

The arrival of more typical fall-ish weather seems to indicate that a change in seasons is upon us. And a new month means a new edition of Hort Snacks.

In this edition, you'll find an increase in the number of events that will be available as fall/winter extension season gets underway, as well as a bit of information gleaned from the Tech Transfer sessions of the 8th International Strawberry Symposium in Quebec City. To top it all off, there is information on some commonly observed diseases and pests that show up in late summer or early fall, as well as a reminder to keep your eyes open for late blight.

If you are electronically inclined, we are trying to reach people through a range of formats, in addition to the printed/electronically written word. Watch for some new short videos on the AF YouTube channel (search for Horticulture Tips – or click the link below) or follow us on Twitter, where "Hort Notes to Self" give regular reminders of things that you might consider doing each month (derived from the "Things to Do" section of the newsletter). You can also join the Hort Snacks Forum (a Google Group), where you can exchange questions and answers as they occur to you (see text box in this edition)

There are some slight format changes coming in the future for the newsletter (mostly to how it is delivered electronically), but if you have ideas for articles, topics, content, events, or other things to share, please send them along. Have a great harvest (if you aren't done yet).

Rob Spencer/Dustin Morton, Commercial Horticulture Specialists
Alberta Ag-Info Centre, Alberta Agriculture & Forestry
310-FARM (3276)

Website of the Month

Alberta Agriculture and Forestry YouTube Channel
Horticulture Tips videos
A series of short videos on horticulture topics (mostly diseases and insect pests)

Horticulture Tips Playlist

ARD Horticulture Microsite – click the image

In this edition of Hort Snacks

THINGS TO DO / THINGS TO THINK ABOUT THIS MONTH

Strawberries

- Good soil moisture must be maintained in June bearing strawberries to ensure maximum branch crown and flower bud formation (next year's production)
- Old weeds should be removed this month. Reducing the amount of foliage and trash will facilitate proper placement of herbicides later this or next month. Cultivation between rows to eliminate weeds, incorporation of straw and aeration of the soil should also be done
- Day-neutral strawberry producers often find irrigation for frost protection beneficial during fall months. Very often producers experience 1 or 2 frosty nights in late August-September followed by weeks of "Indian Summer"
    - Frost protection has proved invaluable during this brief period
    - Water releases heat as it freezes on the plant, thereby keeping the plant parts above freezing. Protection can be obtained down to approximately –6.6°C. At temperatures of –1°C at plant level frost may cause slight injury to open flowers. Medium injury may occur to open flowers at temperatures of –2°C. Producers should have accurate thermometers stationed throughout their field, especially in depressional areas
    - Irrigation should commence when temperatures at ground level reach +1°C. Ice may not form immediately. Ice formation of 1 cm in thickness may form without serious damage to the plants. Irrigation should continue until the ice melts off the plants. A thermometer in the field at ground level in a location not frost protected may assist in determining field temperature
    - Field warming through the use of irrigation during periods of frost is a relatively inexpensive form of insurance. Much of the year's income can be wiped out in one chilly night. Straw mulch within the row is also a definite asset. Some producers find that fibre/fabric row covers are providing 1-2°C frost protection
- Do not apply 2,4-D or Lontrel in September due to flower bud initiation. September is a good time to apply Devrinol or Sinbar to control winter annuals
- Strawberry growers should be making arrangements for obtaining clean rye or wheat straw for mulch this fall. Personally walking farmer's fields to decide how clean (free from weeds) the straw will be might be a good idea prior to purchase.

Apples

- Stop watering/irrigation to encourage shut down and winter acclimation. Apples will continue to grow if water is available

Raspberries

- Prune out spent or fruited canes, as well as weak or diseased canes
- Reduce irrigation this month to encourage hardening
- Consider fall herbicide applications in established plantings – some restrictions apply to certain products (e.g. Casoron)

Saskatoon berries

- Disease pruning and weeding
- If you are planning to rejuvenate (mow-off) your orchard next spring, do not use Casoron this fall

Vegetables

- Remove mature product and cool quickly to ensure maximum post-harvest life
- Field covers can be used to protect crops from fall frosts
- Curing of some crops (potatoes, bulb veg, pumpkins) can help in wound healing and post-harvest lifespan
- Fall planting may be done for some crops (e.g. garlic, spinach, etc.) – timing varies – too late can result in winter injury and poor survival

General / Other

- Mow grass and weeds around plantings to discourage mice as well as reduce insect and disease overwintering sites

Pest Management / Monitoring

- Monitor insects and control if necessary (to reduce overwintering stages)

Q: What activities or products do you offer throughout September?

A: As a non-grower, I spend most of September preparing the winter's offering of extension programing. But September and October are real hotbeds of horticultural offerings across North America. With harvest in full swing, harvest festivals and events are frequent, with on-farm, in-the-field dinners becoming more common. Similarly, themed events, such as pumpkin festivals or fall hay rides are popular things to offer, and corn mazes can still run happily into the fall. The move to create a continuous supply of traditionally highly seasonal products, such as strawberries, and the associated enthusiastic uptake by consumers has meant that late maturing June-bearing strawberries and fall-bearing day neutral strawberries are much more available and on offer at farms and markets around the province. – Rob Spencer (AAF)

Next Month's ? → What sustainable practices do you employ in fall to help enrich your soil?

MENTAL SNACKTIME – Evaluation

- "True genius resides in the capacity for evaluation of uncertain, hazardous, and conflicting information." – Winston Churchill
- "Take a step back, evaluate what is important, and enjoy life." – Teri Garr
- "Fear cannot be banished, but it can be calm and without panic; it can be mitigated by reason and evaluation." – Vannevar Bush
- "The ability to take pleasure in one's life is a skill and is a kind of intelligence. So intelligence is a hard thing to evaluate and it manifests itself in so many different ways. I do think the ability to know how to live a life and not be miserable is a sign of that." – Todd Solondz
- "To address questions of scientific responsibility does not necessarily imply that one needs technical competence in a particular field (e.g. biology) to evaluate certain technical matters." – Serge Lang

Hort Snacks To Go
– Horticulture Winter Webinar Series

Oct 17, 2016 – Barb Stefanyshyn-Cote (Black Fox Farm & Distillery) – *Cut Flowers – Trials, tribulations and what they've learned*

Nov 21, 2016 – Amanda Thomsen (Kiss My Aster blog) – *Making Your Garden Centre Kiss My Aster-proof (so customers come back year after year)*

Dec 12, 2016 – Adithya Ramachandran (Kaleidoscope Gardens) – *Season Extension – Opening the way for new and traditional crops*

Jan 16, 2017 – Dr. Rick Peters & TBA (Agriculture & Agri-Food Canada) – *The In's and Out's of IPM in Carrots*

Jan 30, 2017 – Rebecca Shortt (OMAFRA) – *Irrigation Scheduling with Drip Irrigation*

Feb 20, 2017 – Bob Purton (Kangro Gardening) – *Hydroponic Lettuce Production – the journey*

March 20, 2017 – Suzanne Wainwright-Evans (Buglady Consulting) – Recent Trends in Greenhouse Pest Control & Perennial Issues

For Your Information

The Bauta Initiative on Canadian Seed Security is offering Seed Production Capacity Building Grants. Grants are aimed for seed producers, farmers, farm workers, seed companies, and students learning about ecological seed production. Others excited to build their capacity and understanding of seed production are welcome to apply. For more information: http://seedsecurity.ca/en/204-seed-production-capacity-building-grants

Upcoming Conferences / Workshops

September 2016

- 2016 Canada's Outdoor Farm Show
  Sept 13-15, 2016 – Woodstock, ON
  www.outdoorfarmshow.com
- Potato Europe 2016
  Sept 14-15, 2016 – Villiers-Saint-Christophe, France
  http://www.potatoeurope.com/
- CanWest Hort Expo
  Sept 28-29, 2016 – Tradex – Abbotsford, BC
  www.canwesthortshow.com
- 2nd Canadian Organic Science Conference
  Sept 19-21, 2016 – Montreal-Longueuil, Quebec
  Conference link

October 2016

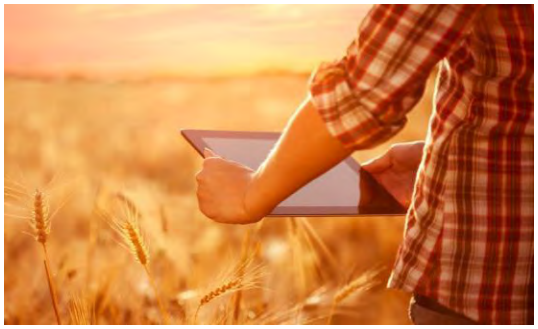
- 2016 Wood Waste Recycling Workshop & Expo Event (SEE POSTER)
  Oct 1, 2016 – Red Deer, AB
  www.awwra.ca
- Canadian Greenhouse Conference
  Oct 5-6, 2016 – Scotiabank Convention Centre, Niagara Falls, ON
  www.canadiangreenhouseconference.com
- PMA Fresh Summit International Convention & Exposition
  Oct 14-16, 2016 – Orange County Convention Centre, Orlando, Florida, USA
  http://www.freshsummit.com/
- Hort Snacks-to-Go Webinar – Cut Flowers
  Oct 17, 2016
- Getting Into Farming – Information Session for the Aspiring Farmer (SEE POSTER)
  Oct 18, 2016 – Airdrie Agriculture Centre – Airdrie, AB
  To Register – call Registration Desk – 1-800-387-6030
- ISA Prairie Chapter – Urban Forest/Natural Forest – Interface of our Green Infrastructure
  Oct 30-Nov 1, 2016 – Sheraton Hotel – Red Deer, AB
  http://www.isaprairie.com/2016-annual-conference

November 2016

- 5th Canadian Food & Drink Summit
  Nov 28-29, 2016 –Toronto Downtown Marriott Eaton Centre – Toronto, ON
  http://www.conferenceboard.ca/conf/foodsummit/default.aspx
- Saskatchewan Green Trades Conference
  Nov 2-3, 2015 – Saskatoon Inn, Saskatoon, SK
  http://www.saskgreenhouses.com
- Hort Snacks-to-Go Webinar
  Nov 21, 2016
- Potato Growers of Alberta Annual General Meeting
  Nov 21-23, 2016 – The Fairmont Banff Springs Hotel – Banff, AB
  www.albertapotatoes.ca
- Green Industry Show & Conference
  Nov 17-18, 2016 – EXPO Centre at Northlands Park, Edmonton, AB
  Pre-conference Workshop
  Nov 16, 2016 – Edmonton area
  www.greenindustryshow.com

Getting into Farming Information Session

For the Aspiring Farmer



Session topics include:

- Overview of Agriculture
- Business Planning
- Personal Assessment
- Financial
- Land
- Resources/Education

Tuesday, October 18, 2016

Airdrie – Agriculture Centre
97 East Lake Ramp NE, Airdrie, AB

Time

9:00 a.m. to 3:30 p.m.
(registration starts at 8:30 a.m.)

Cost: $25/person (includes lunch)

Registration deadline: October 11, 2016

To register call the Agriculture and Forestry Ag-Info Centre at 1-800-387-6030

Growing Forward 2
A federal-provincial-territorial initiative

Alberta Government

Canada

Peace Region

CleanFARMS®

OBSOLETE COLLECTION CAMPAIGN

Return your unwanted or obsolete pesticides and livestock medications

Farmers: safely dispose of your unwanted agricultural pesticides and livestock/equine medications from **September 21-23, 2016** at one of the following locations, *for no charge*.

Wednesday, September 21		Thursday, September 22		Friday, September 23	
Fort St John	Crop Production Services 250-785-3445	Dawson Creek	Richardson Pioneer 250-782-9264	Fairview	UFA 780-835-2288
Rycroft	Dunvegan Ag Solutions 780-765-2865	Manning	Richardson Pioneer 780-836-2771	High Prairie	Crop Production Services 780-523-3266

* Obsolete pesticides and livestock/equine medications will be accepted from 9 a.m. until 4 p.m. at each site on the date indicated.

Program supported by: CropLife CANADA cahi icsa

For more information, please call CleanFARMS at 877-622-4460 or visit www.cleanfarms.ca

Alberta CleanFARMS®

OBSOLETE COLLECTION CAMPAIGN

Return your unwanted or obsolete pesticides and livestock medications

Farmers: safely dispose of your unwanted agricultural pesticides and livestock/equine medications from **October 3-7, 2016** at one of the following locations, *for no charge.*

Monday, October 3

Innisfail	Central Alberta Co-op Ltd 403-505-1467
Edberg	Edberg Crop Management 780-877-0003
Westlock	Crop Production Services 780-349-4525
Smokey Lake	Crop Production Services 780-656-4343

Tuesday, October 4

Provost	Richardson Pioneer 780-753-2511
Alliance	Alliance Seed Cleaning Association Ltd 780-879-3927
Lacombe	Parkland Fertilizers 403-782-2232
Barrhead	Neerlandia Co-op 780-674-2820

Wednesday, October 5

Saint Paul	Andrukow Group Solutions 780-645-5915
Lavoy	Richardson Pioneer 780-658-2408
Athabasca	McEwen's Fuels & Fertilizers 780-675-9500
Camrose	Crop Production Services 780-672-3025

Thursday, October 6

Vermilion	Crop Production Services 780-853-4711
Thorhild	North Corridor Co-op (Thorhild) 780-398-3975
Leduc	Leduc Co-op 780-986-3180
Wainwright	Andrukow Group Solutions 780-842-3306

Friday, October 7

Legal	Sturgeon Valley Fertilizers 780-961-3088
Viking	Andrukow Group Solutions 780-336-3180
Drayton Valley	UFA 780-621-0313
Lloydminster	Crop Production Services 780-871-4601

* Obsolete pesticides and livestock/equine medications will be accepted from 9 a.m. until 4 p.m. at each site on the date indicated.

Program supported by: CropLife Canada, cahi icsa

For more information, please call CleanFARMS at 877-622-4460 or visit www.cleanfarms.ca

8th International Strawberry Symposium – Tech Transfer Sessions – Lessons Learned

The International Strawberry Symposium is referred to as the Olympics of strawberries, since it is held every 4 years, in the same year as the summer Olympics. It moves around the world to different strawberry producing regions, with the 7th edition being held in China and this year's 8th edition being held in the lovely city of Quebec City, Quebec. Participants could take in the full symposium, with a welcome day preceding the symposium, 3 full days of scientific presentations and sessions, as well as several bus tours to different areas around Quebec City, including a major growing region, L'Ile d'Orleans.

The symposium was attended by over 700 attendees, with participants from around the world, including Canada, United States, France, Italy, Spain, the United Kingdom, New Zealand, Australia, Mexico, Germany, Netherlands, Ecuador, China, Belgium, Japan, Korea and Switzerland, to name a few countries. Sessions were presented mainly in English (with simultaneous translation into French); however some sessions were in French (with translation).

Scientific presentations were organized into a number of streams, including breeding, crop management (substrates, fertilization, etc.), genetics, applied physiology, molecular genetics, health, physiology flowering/stress, greenhouse tunnels, pathology, nursery and cropping systems, soil borne pathogens, post-harvest quality, organic production, integrated pest management and world production. Posters were also on display for the duration of the symposium.

Tech Transfer sessions were focused more around issues and topics that would be of interest to growers, with themed blocks of topics, such as an overview of breeding efforts and focus in the various strawberry growing regions of the world (North America, Europe, Asia, Canada), growing strawberries in greenhouses or biofactories, filling production gaps in various production systems using different technology, the health effects of strawberries, pest management topics and worldwide strawberry sales/marketing trends. Presenters were from around the world and were all very passionate and enthusiastic about their topics.

The following are some of the highlights gleaned from some of the tech transfer sessions that I attended (not an inclusive list). Highlights of the bus tour will be featured in the October 2016 edition of Hort Snacks.

- China has over 100,000 hectares of strawberries, with approximately 90 per cent of it in greenhouses

Breeding efforts in North America – Steven Nelson (Plant Science – California)

- There are a number of trends that are influencing strawberry breeding efforts in North America
    - Scarcity of labour
    - Limited water supply
    - Soaring land values
    - Loss of soil fumigants
    - Increased demand for locally grown
    - Increased demand for organic production
    - Emphasis on reducing food waste
    - Others…
- Breeding efforts are split between two audiences, Agronomic versus Consumer
- The focus of the different audiences can result in fruit that don't meet the other audience's needs/wants
- The main three objectives are Flavour, Freshness and Yield
- There are a number of methods that are used to produce new plant material
    - It is important to remember that most programs operate on an 8-12 year timeline
- Challenges like diseases and lack of fumigant options is putting a lot of pressure on breeders
- However
    - The industry will survive
    - Cultivars with broad resistance will be developed
    - We have a great deal of genetic variation to draw from
    - New tools are available to help with breeding

Strawberry Breeding in Europe – Planasa

- Since 1995, 525 new varieties have been registered in Europe
- Taste standards vary by country

Strawberry breeding in Canada – Andrew Jamieson (AAFC – Kentville)

- Historically, there were a number of breeders across Canada
- Now, there are only a couple left with some focus on strawberries
    - Andrew Jamieson (AAFC – Kentville) and Michael Dossett (AAFC – Agassiz; in partnership with BC Blueberry Council)
    - Alan Dale (U of Guelph) – retired but still active
- Each program works on different focus areas, although some are more broad and wide-reaching (e.g. Kentville)
- New varieties are being released annually, with increased availability from propagators/nurseries
- Future breeding will have a national scope
    - A survey is being done across Canada at present
    - Focus may include:
        - Plasticulture and/or matted row
        - Very late short day varieties
        - Day neutral types
        - Emphasis on quality
        - Resistance to things like Angular Leaf Spot

Breeding for Flavourful Strawberries – Klaus Olbricht (Hansabred GmbH & Co. KG – Dresden, Germany)

- Aroma is a neglected area in breeding
- Breeders aren't using the diversity potential in strawberries
- Breeding for sensorical values can be a challenge
    - Taste, aroma, texture = harder things to breed/select for
- In 250 years of breeding, we haven't come all that far
    - The problem is that older cultivars always have a higher acceptance over new cultivars
        - That is why 250 years isn't long enough
    - Older cultivars tend to have much higher levels of the very volatile parts
    - Newer cultivars have lower levels of volatiles or they've been lost altogether
- Negative domestication effect
    - Loss of flavor, reduced resistances
    - Reasons?
        - Bred for yield, fruit size, firmness, appearance
        - High performing selections = in-breeding
        - Narrowing of genetic base and loss of allelic diversity
        - Low heritability of volatile organic compounds (VOCs)
        - Half of the loss has occurred since 1990
- Opportunities?
    - Old cultivars/germplasm = lots of diversity
    - Use methods that include consumer assisted selection and instrumental analysis
    - Look for things that bring the flavor and sweetness while still meeting other needs

Advances in Greenhouse Strawberry Production – Chieri Kubota (U of Arizona)

- Want to increase the off-season production of strawberries
- Traditional schedule is flipped on its head
- Key considerations (supporting technologies)
    - Cultivar selection
    - Plant material
        - Availability is critical
        - Not all types of plants are available year round (e.g. frigo, fresh dug, tray plants, misted runner plants, etc.)
- Photoperiodic flowering types
    - Need to understand fully to get full potential
    - Critical day lengths
- Forcing plants may be necessary
- Want steady production – variety dependent

- Production system
    - Substrate must have good drainage and high porosity, with pH of 5.5-6
    - Drip irrigation
    - Containers for plants
        - Need volume of more than 2L/plant
        - Raised to a height to make for easier picking
        - Range of types may be used
    - Plant density
        - Approximately 7 plants in 1m in staggered double row (0.75m on centres)
        - 10 plants/m^2 of floor area
    - Environmental conditions
        - Daily Light Integral (DLI) is critical
            - NOTE = Inside DLI = 50-70% of outside DLI
        - Light quality is important
            - UV for good quality fruit (anthocyanin content, etc.)
        - Air temperature
            - Day = 18-25°C; Night = 10-13°C
        - Relative humidity
            - Day = 60-70%; Night = 90-95% inside canopy
        - Supplemental lighting may be needed
            - Added cost might not make it worth it
        - Some good research has been done on strawberry crop efficiency of supplemental lighting (Kubota *et al.* 2016 – ActaHorticulturae 1134:403-411)
        - Calculations have been done for lighting costs for indoor vertical farming
    - www.cals.arizona.edu/strawberry

Strawberry Transplant Production in Biofactories – Korea

- Lots of different names
    - Plant Factory with Artificial Lighting (PFAL)
    - Biofactory
    - Plant Plant (P2)
    - Vertical Farms
    - Strawberry PFAL (S-PFAL)
- In Korea, there is almost no open-field production
    - Almost 100% greenhouse or high tunnel production
    - Almost all is doing with forcing or accelerated forcing
    - Earlier and earlier season is critical to get good fruit price
    - There is strong competition with Korean melon and watermelon
- Looking at increasing the number of strawberry transplants that can be harvested from a mother plant in a year
    - S-PFAL for transplant production can be very efficient and rapid
- To create an S-PFAL, you need a number of elements to be able to carefully control growing conditions
    - Need thermally insulated warehouse-like structure
    - Multiple racks (~40cm between) equalized with lighting
    - Air conditioning, CO2 and fans for circulating air
    - Nutrient solution delivery system

Walmart's National Strawberry Sustainability Initiative – Curt Rom (U of Arkansas)

- Major grant program to try and tackle some of the issues with strawberry production in the US
- Strawberry production used to be very much local
    - At the time, 48 states produced 2% or less of the strawberries in the US
    - Challenges for strawberry sustainability
        - Short shelf life product (7-10 days) with a long distance to transport
            - Lots lost in supply chain or in retail
        - Average transport distance ranged from 1400 miles to 2100 miles
- Program had 2 phases
    - First phase focused on work "From Lab to Field"
    - Second phase focused on "Demo to Practice"

- Every project had to have an extension component
- Produced hundreds of tangible outputs (YouTube videos, etc.)
- http://strawberry.uark.edu/
- Outline of projects from Phase 1 – http://strawberry.uark.edu/projects/phase-1/default.aspx
- "Moving the Needle" – outcome report
- "Success in the Field" – http://strawberry.uark.edu/NSSIphase2.pdf

Strawberry Production in Substrate – André Ançay (Agroscope – Switzerland)

- In Switzerland, 518 hectares of strawberries, with 98ha covered
- Growing strawberries in substrate has a number of potential advantages
    - Increase picking speed by 30-50%
    - Facilitate crop maintenance and retention
    - Optimum workforce management
    - etc.
- Raised versus ground = does this affect taste? – most people couldn't tell the difference
- Evaluated/compared several systems
    - Early production – 40% of surfaces
        - Best prices and highest demand
        - Overwintering costs of ~$2.5/$m^2$
    - Scheduled crops – 30% of surfaces
        - Good price and demand
        - Cost of plants was higher
    - Everbearing – 30% of surfaces
        - Longer harvest period
        - High disease pressure and insect pest pressure (e.g. thrips)
        - End of season drop in demand and price
- Looking at a new low-tech raised hill system
    - Increase production surface
    - Replace open field production
    - Suppress soil-related problems
- Low cost?

Understanding Plant Architecture and floral biology of strawberries in different propagation and production systems – Davide Neri (CREA Fruits Research Center – Italy)

- Differentiation is very, very complicated
- It takes about 30-40 days to get a well differentiated flower bud
- Short day stimulation is only needed for a short time, after which, long days/short days don't matter any more
- If want to manage meristem differentiation – need to understand structure and need to manage early
- Can mess with differentiation with fertilizer applied at different places
- Temperature trumps daylength?
- Factors influencing inflorescence
    - Mineral nutrition
    - Transplant
    - Pot size
    - Light quality
    - Leaf removal
    - Temperature?
    - Etc.
- Need to regulate physiological equilibrium between vegetative and reproductive capacity and fruit quality

Compostable Mulch Film – Dan Marten – Novamont - Italy

- 2 case studies
- Mater-Bi mulch film
    - Made from starch and vegetable oils
    - Biodegradable in soil
    - Work in at the end of the crop cycle
    - Material ingested by soil microbes to produce CO2, H2O and biomass
    - Certified compostable in a number of countries
    - Breaks down over 150 days, depending on thickness
    - Can be applied using same equipment as poly mulches
- In field performance (Spain and Italy) found that after 7-8 months, the mechanical properties were still intact
- Compared total production, quality, colour, etc.
- Conclusions:
    - In certain situations, MaterB was better or equal to LDPE mulches
    - No negative results
    - There were soil enhancement benefits
        - Aren't adding non-biodegradable components to the soil
        - No labour to remove
    - Good mechanical performance
    - Good weed control (similar to LDPE)
    - Performance equal to LDPE (yield, quality, etc.)
    - Cost would probably be 2-2.5X that of LDPE
- Additional observations/suggestions
    - Lay it loose – it sucks in tight over 1-2 days
    - Be careful walking on it – if stepped on, breaks and degradation advances
    - Not really for use with fumigants

Strategies for controlling Spotted Wing Drosophila – Catherine Baroffio (Agroscope – Switzerland)

- SWD found in 2011, increases every year
    - Major damage in 2014 in all fruit crops
    - Can find/trap year round
    - Mild winters = reduced winter mortality
- Use different kinds of traps
- Strategy:
    - Publish a technical sheet each year, outlining traps, strategies, etc.
    - They advise mass trapping
        - Traps in wooded areas
        - Traps all around the entire crop (not in crop, because don't want to draw them in)
    - Limited pesticides because of attitude
    - Food grade lime can be a deterrent – very low levels
    - Sanitary measures = most important
        - Short harvest interval (daily or 2 days max)
        - Complete harvest
        - Dispose correctly – not in open compost
            - Can put fruit in a closed/sealed tub – ferments for a couple of days
            - If put in freezer – within 2 hours all larvae exit and die on surface
- Learnings:
    - Winter is very important
    - Place traps in the shade, as SWD doesn't like sunlight
    - Leave traps after harvest – survey all year

- SWD feed on apples, but don't lay eggs on them
- Sanitation = critical
- React immediately
- Every farm is different – shade, wind, etc. – affects trap locations
- Costs of their system = approximately $15K per hectare
- High grasses = contributes to more SWD
- Rather than empty traps, just add news ones – empty at end

Enabling on-farm strawberry disease management by linking basic and applied research to extension programming – Frank J Loews (NCSU)

- IPM = challenge to develop programs
- Need to use all of the tools
- Need to "Know your Enemy"
- There are some good diagnostic videos and keys/tools out there
- www.Smallfruit.org

Biobest – Using bumblebees for targeted application of biopesticides – Sara VanBeneden (BioBest – Belgium)

- Testing a bee-vectoring system to introduce biological control agents into crops
  - Vector + BCA = flying doctors
- Pollination + Crop Protection
- Select most efficient vector
  - Crop dependent
  - Honeybees and bumblebees are available year round
  - Greenhouse crops – bumblebees only
    - Widely used; most effective
  - Field conditions – bumblebees vs honeybees
    - Bumblebees have better flight activity in cloudy/rainy weather
    - Also stay in closer proximity to their nest
- Hive mounted dispensers – several models
- Create bottlenecks
  - Impact on bumblebee flight/pollination activity
  - Sufficient loading of outgoing bees
  - Ensure no brood contamination
- Technology has evolved
- 2013 – commercially available hive dispenser system
  - Easy introduction of product in replaceable tray
  - When bumblebees exit through dispenser, product adheres to their legs and the bottom of the abdomen
  - Patented 1-way traffic design – only pick up when exiting
- Selection of BCAs
  - Effective towards disease or pest at low concentrations
  - Compatible with vector
    - No toxicity
    - Good dissemination (reasonable adherence)
  - Able to germinate and colonize in flower
    - Needs to be a fast colonizer
    - Able to survive adverse environmental conditions (e.g. UV)
- Prestop 4B – *Gliocladium catenulatum* J1446
  - Competes for nutrients and location
  - Mycoparasitism
  - In trials, proven efficacy for botrytis in bees

- Authorized in Belgium, France, Netherlands, Finland
- Introduce at beginning of flowering
- Almost as effective as chemical controls in 14 day post-harvest trial (low temperatures and warmer 4°C)

- BioBest has compatibility charts for BCAs and bees

North American Sales/Marketing Trends – Chris Christian (California Strawberry Commission)

- Consumption of strawberries per capita is increasing, because of health benefits
- USA = net importer
- Canada
  - Market dominated by imports
  - Local = important
  - Per capita consumption flat or declining – less availability of imports?
- Canadian Market
  - Local = very important
  - Quebec = 54% of production
  - Most through retailers
  - Domestic production through wholesalers
  - Consumption very highly correlated with availability
  - Import market dominated by USA, then Mexico
- Consumer Trends – USA and Canada
  - Berry category = top category for past 7 years
    - $2.8 billion
    - 4th most frequently sold fruit
    - Top 7 in fruits and veggies
  - Berry dollar sales
    - Strawberry = 47% - steadily dropping because of availability of blueberry and raspberry
    - Continued growth in total sales
  - Canada = largest sales
    - Berries = $billions
  - Strawberries = $355 million
- Average purchase amount/frequency = 6 kg, 8x per year
  - Need to push mid-buyers to heavy buyers
- Factors
  - Appearance and price = top decision factors
  - Flavor = big role in repeat purchases
  - Country of origin = increasingly more important
  - Canada = appearance and price; locally grown and origin
- Summary
  - Production and consumption = increasing
  - Mexico = largest growth
  - Consumer interest in health benefit
  - Younger buyers

Sales Strategies for Different Areas – Drew Reynolds – Total Produce, UK

- Strawberries are set to outsell milk and bread soon – headline in UK paper
- What is driving sales growth (demand)?
  - Easy to enjoy (convenient)
  - Grazeability
  - Unique place in consumers' hearts and minds (emotional bond)
  - Ever-improving availability – growth in winter sales
- Sales doubled in last 10 years
  - Trust and confidence – grower, breeder, seller

    - Year round availability (12 months)
    - Perfect strawberry every time
    - Despite changes on production/packaging side, still just a strawberry
    - Fast approaching commodity status
    - Others…
- Managing peaks in production (and lulls in demand) is challenging and important
- Varieties
    - Eating quality and consistency = highly important
    - Brix = key measure
    - Retailers have approved variety lists
    - Consumers don't like dark berries
    - Yield/plant is value when price comes under pressure
- The future?
    - Tabletops and substrates are here to stay
    - Increased densities
    - New varieties – yield and eating quality
    - Seasonal management and extension – managing the peaks
    - Sustainable growing system – cost reduction
    - Retractable structures
- Packaging
    - Tamper proof
        - Consumer has confidence in product
    - Shelf life enhancement
- Opportunities
    - Packaging
    - Marketing data
- Threats
    - People – migrants and how they are treated
    - Social media
        - Scare stories
- New trends
    - King and baby berries
    - Consumer quality panels
    - LEAN – cost chain analysis
    - Smartphone shopping

Quebec – Les Fraises du Quebec

- Quebec Marketing
    - Social media
    - Instagram – for connecting with bloggers
    - Consumer partnership – e.g. tie dairy and strawberry
        - Cross promotion
    - Industry partnership
- Yield Prediction Tool

Food Trends – Kim Essex – North American Food and Beverage Practice, Ketchum

- Food involved – food decision-makers in the home
- Food eVangelists – educate themselves to influence them and you
    - Proactively talk about food for 4X+ per week
    - Change agents
    - Not activists – but get aggravated if ignored
    - Skeptical
    - Values driven
    - Leaders
    - They listen to everyone, but trust no one, because no one is an expert
    - Perfection is impossible
    - Scour for information
- Population of eVangelists globally is increasing (10% increase from 2013 to 2015)
    - Major increases in some areas (e.g. 24 to 37% in China)
    - Getting younger
- Children of eVangelists are the mass market of tomorrow
    - Ketchum Food 2020 – The Children of Food eVangelists
- Tracking trends
    - Fresh is where it is at
        - 70% report buying more fresh than a year ago
    - Growing preference for local vs mass vendors
        - Retailer is local in other regions
        - USA = exception
    - Small is hot, big is not (companies, etc.)
    - The flexible supply chain
        - Retailer has to be consistent supplier so must bend traditional suppliers
    - Responsive design coming to food near you
        - E-commerce = unparalleled power
        - Likely new purchase drivers
        - Mobile makes more possible than ever before
    - Hits you in the gut
        - Health = key driver in consumer demand
        - Food and beverages
            - Used to be culprit in gut health
            - Now seems to potentially be part of the solution
    - Message in a bottle
        - Delivery tool
        - Nutrition in a bottle
    - From Me to We
        - Healthy food for all
        - Social justice thing
        - Healthy food shouldn't just be for the privileged
    - Moral Food
        - The next Big Cause
            - Workers' rights
            - Gender stuff, etc.
        - Think about your sustainability story
        - Sustainability: A Diet Plan

- So, what do we do?
  - Be everywhere in their world
    - Broad communication
    - Provide information to your partners
  - Global nutrition professionals edge out friends
    - Credentials matter
    - There is a hierarchy/scale of trust, with high, medium, low levels
    - Top = family, nutrition practitioners, friends, local farmers, medical professionals
    - Medium = chefs, academics, consumer groups
    - Low = Ag companies, etc.
  - Multiple sources are valued equally
    - Food eVangelists seek info everywhere instead of trusting a single source
  - Don't "sound bite me"
    - Twice as many want access to information, people and experts versus bites and bites on social platforms
  - Communication that works
    - Find the common ground between their truth and your truth
    - Start on fundamentals and common ground
- Implications for You?
  - Honesty trumps perfection
  - All media matters
  - Share in every channel possible
  - Access is more important than reach
  - Communication is more than words – marry actions
  - Focus on future food eVangelists – need your attention today

Equipment For Sale / Wanted:

1) Carrot Digger / Top lifter
   - Mid 1990's DeWulf P3k 3 point hitch mount top lifter
   - Has only been used one year in the last 6
   - Works well
   - Text or call 403-330-7480

Google Groups – HORT SNACKS FORUM

Google has all sorts of different features and tools. One that I ran across a couple of years ago is *Google Groups*. You can essentially create and join common interest groups or discussion forums and share information and ideas back and forth. You can alter the settings to get forum updates all the time, daily, weekly or whatever.

A couple of years ago, we created a HortSnacks Forum, tied to this newsletter. Anyone can submit posts (questions, comments, etc.) via Google or via email. To submit a question (or post), either log into the group using a Google account or simply send an email to hortsnacks-forum@googlegroups.com and it'll send it to all members. You can reply from email or from Google.

To subscribe to the group, send an email from your email account to subscribe+hortsnacks-forum@googlegroups.com
Try it out today!

End-of-Season Checklist for Managing Late Blight

In recent years, late blight has, at times, been confirmed in parts of Alberta and has then spread through various regions. With the intent of returning to late blight-free status, increased awareness efforts have been instituted in both the industry and the public. Everyone was encouraged to increase early and season-long monitoring of fields, gardens and greenhouses in order to protect crops from late blight, as well as have a quicker response to any perceived infections.

As the 2016 season starts to head towards the finish line, no cases of late blight have been confirmed in Alberta. Spore trapping continues as an early detection device, and spore levels have been climbing in some areas, suggesting that *Phytophthora* is active somewhere, if not on crops; therefore, it is recommended that all growers of potato or tomato (commercial or home garden) take specific steps to prevent the carryover of disease into future years, as a number of valuable crop industries in Alberta could be impacted by repeated outbreaks.

In the late parts of the growing season, ensure that plants die down quickly using top-killing treatments such as chemical desiccant (diquat) or mechanical treatments.

At the end of the growing season, gardeners should dispose of all above-ground plant materials (stems and foliage), whether infected or not, either by burial, freezing or composting. The purpose is to ensure that living tissues do not survive the winter and will break down completely, thus preventing carryover of the late blight pathogen. Avoid placing infected materials in uncovered compost piles as spores may be produced and spread the disease to nearby plantings of susceptible crops. Piles may be covered with a tarp until the materials have frozen and are completely dead.

Since tubers represent the primary method of disease carryover in potatoes in Alberta, every effort should be made to prevent the survival of infected tubers. Recognize that some of the recently prevalent strains of the late blight pathogen are more aggressive on tubers. Carefully grade and sort harvested potato tubers in an effort to remove any infected tubers. Commercial seed growers should be prepared to further grade seed tubers in the spring, and mancozeb-based seed treatments should be applied to try and protect developing crops from seed-borne late blight.

Culled tubers should be disposed of in such as way at to encourage them to breakdown over winter. Culled tubers can be fed to livestock or may be chopped, incorporated and buried, or can be placed in covered piles until they freeze completely. Ensure that potatoes do not volunteer (grow in another crop).

The late blight pathogen normally cannot survive away from living tissues. While the disease can survive for a time on tomato fruit, spores will not carry over on tomato seed. The disease can be introduced on living tomato transplants that are brought in from areas where late blight survives the winter.

In Alberta, the late blight pathogen does not survive or overwinter in the soil, so growers should not worry about re-infection by planting in or adjacent to a field where late blight has occurred, provided there are NO surviving tubers that could reintroduce the disease through infected volunteer plants. However, rotating between locations is always recommended, whenever possible, to prevent the build-up of other diseases.

All growers should take the time to assess the past growing season and the level of risk of late blight infection or re-infection that they will face for the next growing season. Determine where disease might have come from and put preventative measures in place to protect against infection. It is in EVERYONE'S best interest to manage late blight, as this is a community disease. It is also critical that everyone take an active role in submitting suspect material to improve detection and management.

If you have questions regarding identifying or dealing with late blight, or wish to submit a sample for testing, please contact 310-FARM (3276) for assistance. For more information on late blight, consult the following document – FAQ – Late Blight of Potatoes and Tomatoes.

INSECT OF THE MONTH

Tuber Flea Beetles

Three different species have been found in Alberta (*Epitrix cucumeris, E. subcrinata, E. tuberis)*

Crops Affected: potatoes

Life Cycle:

- Of the 3 species found in Alberta, only *E. tuberis* is known to cause serious damage to tubers
- Adults are small (up to 2mm long), black beetles that jump when disturbed
    - Adults can fly – may move this way into new potato fields
    - Adults feed on potato foliage, resulting in leaves with a characteristic "shot hole" appearance
        - Flea beetles are more frequently found on the underside of leaves
        - Damage is not usually economically significant, however high populations can defoliate and kill young plants
- Larvae are slim, white and up to 5mm long
    - Larval feeding on roots and tubers is a major concern to potato growers in some areas
- Flea beetle adults overwinter in the soil in and around potato fields
    - Their survival is increased in elevated areas that are free from flooding
- In mid-May to early June (around the time that potatoes emerge and are growing), the 1st generation of adults emerge and begin to feed and mate on potato foliage
    - Eggs are laid in the soil and 1st generation larvae emerge and feed in the soil on tubers from early June to mid-July.
- In Alberta, under typical conditions, only one generation is observed, however a second generation can occur under warm conditions.

Symptoms:

- Adult feeding results in "shot hole" damage on foliage
- Larvae burrow into tubers, feeding under the skin, resulting in a network of shallow tunnels
- While feeding does not reduce yields, it does cause cosmetic damage to tubers that may result in reduced marketability and down grading
    - Damage is more common in mid to late harvested crops
    - Damage may reduce storability of the crop
    - Damage may tend to become more obvious as tubers are stored and begin to loose moisture

Monitoring:

- Monitoring for flea beetle adults is an essential step in their control
- Beetle populations tend to be higher closer to the field margins, due to the tendency of adults to overwinter adjacent to the fields and the ability of adults to fly in from surrounding areas
- Plants should be scouted from early emergence until plants reach 30 cm in height
    - Early scouting involves the examination of individual plants (sample sets of groups of 10 plants separated by 40 paces) both along the crop margin and within the remainder of the field
    - Later scouting (for plants larger than 30 cm) can be done with a sweep net
- The threshold population would be 1 beetle per 60 inspected plants for early scouting and 1 beetle per 10 sweeps for later scouting

Management:

- Flea beetle populations can be reduced through regular crop rotations
    - Populations will tend to build up with repeated cropping
- Separation from other fields and freedom from volunteer potatoes can also help to minimize levels
    - On a smaller scale, removal of plant residues may limit the ability of the flea beetles to overwinter and may reduce the pest population
- Earlier crops tend to be less affected than mid to late crops due to lower beetle populations and damage symptoms may be reduced or less apparent
- Chemical controls can be effective in reducing egg-laying adult populations and the subsequent numbers of emerging larvae
    - Spraying should be based on monitoring and economic threshold populations
    - Chemical controls are most effective when applied early in the season
    - Spraying to control the adults prior to egg-laying is the only option, as spraying to control larvae is not possible

Tuber flea beetle larval feeding damage
Photo by cals.uidaho.edu

Flea Beetles and Potato - FAQ

Pest Management Regulatory Agency (PMRA) – Electronic Label Search Engine
Search the database for electronic labels

Bronze Leaf Disease

DISEASE OF THE MONTH

Apioplagiostoma populi

Crops Affected: Swedish Columnar Aspen, tower poplar, poplar hybrid clones

Disease Cycle:

- Spores are released from mature perithecia (spore-producing structures that develop on overwintered leaves)
- Rain and moderate to warm temperatures (18°C) lead to spore dispersal
- Spores are spread during spring to infect leaves on the same tree and other adjacent trees
- Disease development will occur over the course of the summer
- Infections will spread internally (systemically) to other parts of the tree, in addition to spread by spores
- The disease may also be spread during propagation of infected plant material

Symptoms / Conditions favouring development:

- Typically appear in later summer (early-mid August) or early fall (September)
- Areas of the plant (often individual branches or a few leaves) will suddenly exhibit symptoms
- Symptomatic areas can be spread around the tree
- Leaf tissues turn orange-brown to reddish-brown, starting from the edges of the leaf, moving inward towards the base of the leaf
- Leaf veins and petiole remain a bright green colour
- All leaves on a branch may be affected
- Discolouration deepens to a bronzy, reddish-brown colour as the season progresses
- Infected leaves will often remain attached to the tree over the course of the winter (they do not fall off)
- Branches may dieback as the disease progresses systemically
- Leaves that overwinter may have a pebbly surface texture (like the surface of a curling rink), reflecting the development of spore-producing structures (perithecia)

Management:

- No chemicals are registered for the management of this disease
- Avoid planting highly susceptible types in areas where disease is present
- Sanitation is the main management practice
    - Remove and destroy fallen leaves
    - Prune off infected branches back to healthy wood – in the case of most susceptible poplar and aspen hybrids, this means back to the trunk
- Avoid planting trees species too close together
    - This improves air flow and reduces leaf debris accumulation
    - Increased density will increase humidity and potential ease of spore transfer
- Canopy density should also be kept open, to allow good air movement
- Remove infected trees
- Avoid propagating from infected material

Ensure plants have sufficient light, moisture and nutrients

Featured Video

Horticulture Tips – Bronze Leaf Disease

Photos by Robert Spencer

Characteristic BLD symptoms – leaves turn an orangey-brown/reddish brown from the margins inward, with the main veins and leaf petiole (stalk) remaining a bright green colour