



Welcome to another edition of Hort Snacks. Springs seems to have been compressed into a very short two weeks (4, if you want to be generous). Plants have gone from bare and dormant to fully leafed out and in flower in the span of a few weeks. The unsettled weather has been a bit challenging, especially when it comes to getting crops in the ground, but gradually, it is happening. Hopefully things will settle down and we can have a nice average summer.

In the meantime, there are a number of things for you to read and consider in this edition. There are a number of semi-related articles, both new and “fresh” from the archives, most of which relate to the considerations around decisions to expand or change direction in an operation. Hopefully, they get your minds stimulated in a productive way.

Otherwise, planning is underway for the coming summer season and the year ahead. If you want to stay in touch about the things that are happening on your farm, feel free to send a note at any time. We’re happy to get updates this way, as we can’t always get out to every farm, as much as we would like to. As always, for any question or concern, we are just a phone call or email away. Have a great summer.

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FEATURED WEBSITE

Some interesting weather-data/info websites/apps

Ventusky

<https://www.ventusky.com>

AccuWeather

<http://www.accuweather.com/en/ca/alberta/weather-radar>

Alberta Climate Information Service – Weather Radar Imagery

<http://agriculture.alberta.ca/acis/weather-radar.jsp?region=alberta>

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THINGS TO DO / THINGS TO THINK ABOUT THIS MONTH

Strawberries

- Maintain good straw cover on all strawberries, as this reduces the incidence of disease
- Apply 3-5 cm (1 –2 inches) of straw to newly planted Day-neutrals
 - 3 – 5 cm (1 – 2 inches) = 40 small square or 3-4 large round bales per acre
- Initiate applications of nitrogen to Day-neutrals – 10-20 lbs actual N/ac/month – may be split into weekly or bi-monthly applications

Raspberries

- Consider trellising options for primocane types

Saskatoon Berries

- Application of nitrogen and phosphorus (2nd of 2 – split application) – 15-25 lbs actual N/acre; 10-20 lbs P/acre – adjust rate when banding
- Arrange harvesting, refrigeration and sales outlets of Saskatoon berries

Vegetables

- Transplanting of most warm season plants should / be completed in the first part of the month (if it wasn't done late last month)
- Complete any additional staggered-date plantings of crops

Interesting News / Articles to Read this month

- [Considering Cover Crops? Find Out Which Method Works Best](#) – Growing Produce article
- [Designing Your Greenhouse IPM Program](#) – Greenhouse Canada article
- [The Best Way to Plant Seeds](#) – Bright AgroTech article
- [How produce companies are increasingly marketing to kids](#) – CBC.ca / HortiDaily article
- [4 Simple Ways to Upgrade Your Hoophouse this Summer](#) – Upstart University article
- [How to Identify and Mitigate Herbicide Contamination in the Greenhouse](#) – Greenhouse Grower article
- [Holding Vegetable Plug Transplants](#) – OMAFRA article
- [What size of greenhouse do you need?](#) – HortiDaily article
- ["Clear communication creates increased revenue"](#) – HortiDaily article
- [Smackdown: Hydroponics vs. Soil-Based Organic Growing](#) – Growing Produce article

General / Other

- Ensure that irrigation and spray equipment is ready to go
- Monitor and maintain optimum soil moisture conditions in all crops (pay close attention to critical moisture stages – see [Water Requirements in Horticulture Crops - FAQ](#))
- Maintain good weed control in field and headlands
- Final arrangements for marketing of crops, e.g. pails, buckets, training of field personnel, advertising, etc.
- Put honeybee colonies in field at start of flowering (~2 hives per acre)

Pest Monitoring / Management

- Continue regular and thorough scouting / monitoring of fields for disease and insect pest problems
- Remove diseased plant material
- Use appropriate control measures if necessary
- Adhere to "Days to Harvest / Pre-Harvest Interval" and "Re-entry Intervals" (for worker and customer safety)
- Strawberries
 - Monitor strawberry fields for aphids, Tarnished Plant Bug, bud/clipper weevils, root weevils, leaf rollers
 - Botrytis fruit rot control sprays at bloom stages are most effective; apply at 5-7 day intervals
- Saskatoon berries
 - Application of insecticides (Decis/Poleci) and fungicides (Topas / Mission / Jade / Fitness / Prozol / Propi / Propi Express / Pristine / Switch / Kumulus / Cyproflu) at later bloom stages (petal drop, green fruit) – depending on development of crop
- Black Currants
 - Monitoring (and control if necessary) of aphids, sawfly (imported currant worm or currant fruit worm)

REMEMBER – DO NOT APPLY DISEASE/PEST CONTROL SPRAYS DURING FULL BLOOM (Saskatoon berries, currants, raspberries) – most insecticides are toxic to pollinating insects and some fungicides have repellent qualities

NEWSLETTER USE RESTRICTIONS

Please feel free to share all or portions of this newsletter with other interested parties.

If you want to use content from this newsletter in other media, please request permission before doing so.

DUTCH ELM DISEASE AWARENESS WEEK

June 19-25, 2017

DED Hotline 1-877-837-ELMS (3567)

www.stopped.org

Upcoming Conferences / Workshops

June 2017

- **14th International Conference of the European Industrial Hemp Association (EIHA)**
June 7-8, 2017 – Maternushaus – Cologne, Germany
<http://www.eiha-conference.org/>
- **Early Ripening Haskap Tour**
June 23, 2017 – Horticulture Field Lab – Saskatoon, SK
www.fruit.usask.ca/extension.html
- **Greenhouse Canada Grower Day 2017**
June 21, 2017 – Holiday Inn – St. Catharines, ON
<http://www.greenhousecanada.com/grower-day/>
- **International Floriculture Expo**
June 13-15, 2017 – McCormick Place, Chicago, Illinois, USA
<http://www.floriexpo.com/>
- **Organic Alberta Field Day – Soil Health Masterclass**
June 21-22, 2017 – Ferintosh, AB
<http://organicalberta.org/article/soil-health-masterclass-with-nicole-masters/>
- **Tentative - Hort Snacks in the Field (CSA/Growing Season Extension focus – North Alberta)**
June 27, 2017 – Sand Springs Ranch – N of Lac la Biche, AB

July 2017

- **Haskap Days Extravaganza (4 separate days)**
July 19-22, 2017 – Various sites around University of Saskatchewan – Saskatoon, SK
www.fruit.usask.ca/extension.html
- **Cultivate 17 (Formerly OFA Short Course)**
July 15-18, 2017 – Greater Columbus Convention Centre – Columbus, OH
<http://cultivate17.org/>
- **101st Potato Association of America (PAA) Conference**
July 23-27, 2017 – Holiday Inn – Fargo, North Dakota, USA
www.potatoassociation.org OR <http://z.umn.edu/paa17>

August 2017

- **North American Strawberry Growers Association (NASGA) Summer Tour**
Aug 15--16, 2017 – Minneapolis, Minnesota, USA area
www.nasga.org
- **Farwest Show**
Aug 23-25, 2017 – Oregon Convention Centre – Portland, OR
<http://www.farwestshow.com/>

TENTATIVE – DETAILS TO COME SOON

Fruit & Vegetable Field Day CSA/ Growing Season Extension (June 27) – Sand Springs Ranch (N of Lac La Biche)

The plan for this year:

- Afternoon (starting with lunch)
- Focused / Specific topics
Watch www.albertafarmfresh.com OR
AAF [Coming Events](#) for event details.

MENTAL SNACKTIME – Expansion

“There's no limit possible to the expansion of each one of us.” – Charles M. Schwab

“Evolution is a process of constant branching and expansion.” – Stephen Jay Gould

“Love is the expansion of two natures in such fashion that each include the other, each is enriched by the other.” – Felix Adler

“This is important: to get to know people, listen, expand the circle of ideas. The world is crisscrossed by roads that come closer together and move apart, but the important thing is that they lead towards the Good.” – Pope Francis

“Gratitude helps you to grow and expand; gratitude brings joy and laughter into your life and into the lives of all those around you.” – Eileen Caddy

See [Meeting Customer Requirements](#) if you are a processor or producer wanting to enter a new market. Are you uncertain about whether you can meet regulations and standards?

Use this new online resource to help you:

- Evaluate whether your business is ready to access a new market
- Take the necessary steps to meet the regulations and standards
- Maintain your system through an internal audit
- Demonstrate that you are meeting requirements through an external audit.

The e-resource can be downloaded on your computer or tablet at agriculture.alberta.ca/customer-requirements.

The resource is designed in a way that allows you to choose any particular section. You do not have to go from start to finish. If you can't finish it in one sitting, no problem, you can resume where you left off.

If you have questions about the e-resource, e-mail meetingrequirements@gov.ab.ca

GROWING FORWARD 2 PROGRAMS

Have a look at the Growing Forward 2 website to see the open programs that have funding available in different areas. There are a number of programs that have funding that is applicable to horticulture producers (small and large; new entrants or established) or groups. These provide funds for a bunch of areas, including things like training and/or skill development, expansion/succession planning, equipment for increased efficiency, innovative products, increasing competitiveness, etc. Don't be afraid to be creative in your ideas.

Please note, programs open and close, depending on funding levels, applications, etc. This is the final year of GF2, and the future program's name, format and content has yet to be determined. Visit the site regularly to see which programs are taking applications.

If you want to apply or have questions of what is in and what is out or on eligibility, contact a New Venture Coach or a business development officer or the contact for the specific program. Applications have to go through staff to be vetted or reviewed.

www.growingforward.alberta.ca/programs

BE ON THE LOOKOUT FOR LATE BLIGHT

Over the last few years, there has been a great deal of concern in Alberta surrounding a serious disease called Late blight that affects mainly potatoes and tomatoes. This disease is caused by a fungal pathogen called *Phytophthora infestans*. The favourable conditions for disease development, combined with the presence of the pathogen, have resulted in multiple outbreaks of Late blight in commercial, market garden and urban potato and tomato crops throughout parts of Alberta in past years. A number of different strains of the pathogen have been identified in different years, each being more or less aggressive on either potatoes or tomatoes. For 2017, this disease continues to be a risk for all Solanaceous crops (potato/tomato family) grown in Alberta.

It is recommended that ALL growers of potatoes and tomatoes be extra vigilant to try and catch any diseased material early on, before a significant outbreak can occur. In the early season, growers should watch for:

- Tomato transplants and newly emerged potato shoots with water-soaked leaf lesions
- Plants that develop lesions early on in the season or as the season progresses, particularly if conditions are moderate and wet/humid

If you find plants showing suspicious lesions, it is recommended that you can contact 310-FARM (3276) to determine if further testing is required and to discuss management. Please do not hesitate to report an incidence, as early awareness will help to prevent and contain an outbreak and can help others to protect their crops.

While undertaking identification, producers should dispose of infected material as quickly as possible, removing disease parts (small scale) or killing out plants so disease cannot develop further. Protective fungicide applications can be made if conditions favour disease (and if disease is known to be present in the province)

Information on Late Blight

[FAQ – Late Blight of Potatoes and Tomatoes](#)



Q: What key factors do you use as indicators for making expansion (or reduction) decisions?

A: LAAAAAAAAABOUR

A: It's always in the numbers. How many staff would I need to get bigger, how much automation, is there enough population to support an expansion? The decision for me to decrease was also in the numbers and the labor. I actually made more net profit being a smaller operation and working it myself charging a little more for the product.

A: The key factor in our decision making is cost and demand. As we are restricted to size it has reached the point where expansion of 1 product means contraction of another so the economics has to be there

A: Return on investment i.e. money and time

A: Return on investment of expansion (needs to be 3X or greater) and labour cost. Reduction: cost per square foot and labour.

A: If it makes money, expand - if it loses money - quit

A: Time

Next Month's ? → [Herding cats - what are some useful customer management tools that you use in your operation?](#)

To Expand or Not To Expand – That's the Eternal Question

Every business operation goes through cycles and stages. You might see periods of rapid growth and big changes or you'll see slow, steady change, forwards or backwards.

Every business grows at its own pace. The rate of growth will vary from person to person, business to business. It depends on a number of factors, largely based around economics and resources. These might include basic things like supply and demand, such as whether you can supply the demand for your product (assuming there is demand and that you have room to grow up to match it). It might relate to financial resources, such as whether you can you afford to grow and invest in the growth of your business. Quite likely, it comes down to bodies, meaning human resources. How many people do you have available, either at the start or further down the road? Are you a group of partners that can divide and conquer and share the workload or is there just you and your ideas?

Early on, you might see multiple years with rapid growth, with a significant increase in size from one year to the next. This would be normal, as you are finding your place, increasing your skill, experience and capacity, as well as stretching from a startup to something that is pretty established. You might tend to blow over and past some of those barriers that might slow a larger or more established business, simply because the returns on the rate of growth are much higher and more obvious and maybe the risk is slightly lower. There is a big gap between what you are producing and what is demanded by customers, so it is easy to see the connection between a decision to grow and the value of it. However, a smaller operation might have greater risk related to decisions such as equipment purchase, etc. or they might not be able to take advantage of equipment or automation-related growth.

Once established, the rate of growth may or may not change, depending on the same factors that affected a young business, but the risk can be a bit higher and the decisions might be a bit bigger. The solutions and the decisions that were "no-brainers" for a small business might need a bit more thinking and number crunching. On the flipside, a bigger operation might have the funds to purchase equipment more readily than its smaller counterpart.

It is a bit like a boat. A little boat is pretty nimble and is usually able to take advantage of sudden changes in wind, current, etc. It is quick to turn and catch that new tack. A big boat is slower to come around and react to changes. At the same time, it can handle bigger changes gradually or take on more cargo, whereas a little boat is limited. A big boat can handle bigger changes better than a small boat, but it is slower to come around and react.

When it comes to expansion, ultimately, you have to look at whether expansion is possible with the finite amount of resources that you have. Can you handle the growth (and associated increase in work) with your current labour force? Can you afford to make the change? If there isn't room in the budget or in the existing operation, what is going to have to be dropped to make space for the new thing and will the new thing be worth it? Is there a way to make the expansion work, if you come at it from a different direction? How long will the expansion last? Will the advantage of the expansion be sustainable or will it become dead weight if things change down the road?

All of these factors need to be considered. Take some time to weigh things out. Talk to a trusted colleague or partner. Do the math. But then, if it is worth it, embrace it. Here are a couple of quotes to drive it home.

"Forget past mistakes. Forget failures. Forget everything except what you're going to do now and do it." – William Durant, co-founder, General Motors

"And the day came when the risk to remain tight in a bud was more painful than the risk it took to blossom." – Anaïs Nin, writer

Deep Thoughts – Innovation and Success - Perseverance vs. Futility

In recent conversations and while listening to a motivational speaker, I noticed a common theme; successful figures and what they had created or accomplished. One example involved the person that created Velcro®, which came about after finding burs in his dog's fur. Another example was the men who created Post-It® Notes, combining one man's desire for reusable page markers with another's work on glue. There are many examples in the world of visionary and/or creative people that have taken an idea, developed it and then ran with it, to great success. We celebrate those success stories. In my years of working with producers of all types, I've continually been impressed by the ingenuity and innovation of the people I've come across.

In photography, you can change how something looks by shifting the contrasts (or the tones) of the image. By creating stark contrasts, you sharpen the lines and can see certain things clearer than when things are presented in shades. In life (you pick the area), when you make a study of contrasts, you can sometimes gain interesting perspectives and insights.

Shift the contrast and consider the previous examples. If we look at them solely as successful ventures, we perhaps fail to recognize the challenges that were overcome, the failed experiments, or even the luck (if you believe in it) that was necessary prior to success. It took 10 years to create Velcro®. The Post-It® Notes success hinged on the fact that the glue was a weak adhesive, as opposed to the desired outcome, a super-adhesive.

You might, at this point, be wondering what the point of this article is, compared to the title of it. While innovation and success can, and are, great goals, consider the subtle contrasts between the personality traits that drive, or are associated with, innovation.

Perseverance is defined as:

- Steadfastness in doing something despite difficulty or delay in achieving success
- Continuing in a course of action without regard to discouragement, opposition or previous failure
- Persistent determination to adhere to a plan of direction

Perseverance is a quality that you'd probably agree is useful in driving towards innovation and success. However, consider other words that are synonyms for perseverance: persistence, tenacity, pertinacity, insistence, constancy, endurance, obstinacy, stubbornness. I'd postulate that as you go from the front of the list to the end of it, you're seeing a shift in contrast.

Perseverance is considered admirable and desirable. Stubbornness is perhaps less desirable. But it is a subtle difference. Apply this to a quest for innovation or even to something as simple as a production practice, marketing idea, etc. on your farm operation. In plain and simple terms, we might work hard to achieve success in an area or to bring a great idea to fruition, pushing past the obstacles, the brief challenges and the little hiccups that typically occur. But at what point does perseverance become stubbornness and then slip into futility? At what point should you abandon what was beautiful in concept, but not worth it in practice (even if only temporarily)? It takes a shift to see things in stark, crisp contrast and be able to either adjust or walk away.

Thomas Edison, the famous inventor on the 19th century, offers some interesting perspective on where you might draw the line. Edison is recorded as having said "*Many of life's failures are people who did not realize how close they were to success when they gave up*" (1877) and is attributed as having said something along the lines of "*I have not failed 10,000 times. I have not failed once. I have succeeded in proving that those 10,000 ways will not work. When I have eliminated the ways that will not work, I will find the way that will work.*"

Granted, he succeeded. And maybe over 100 years ago, it was easier to push forward to innovation, despite many failures, whereas today, we have to succeed quickly or move on.

Where do you draw the line? It isn't a cut and dried answer, by any stretch. The line depends on whether you have the time and/or resources (economic, emotional, etc.) to push through to success. You will have to decide. Use your own, personal tally system to find an answer to whether you are persevering or stubbornly persisting in a failed venture.

Making decision-making easy

Every single day, people make literally 100's, if not 1000's, of choices that affect miniscule parts of their lifestyle. What to wear? What jam to put on toast? What road to take to work? And so on. It can get to be a bit overwhelming.

At the same time, there are many internal choices or decisions that people make, based on principles, values or other factors, that don't have a huge impact on the world around them, but can be very important to them. Sometimes, in some situations, people have to make choices that go against these factors, or have to pick the "lesser of two evils" which can be a bit maddening.

For those of us that are "decision challenged" (a.k.a. indecisive), making a decision with regards to a purchase or some concrete action can be an agonizing ordeal. We hum and we haw and we eventually, tentatively, make a decision with which we may be happy initially, but may also look back on with regret or with a lack of complete satisfaction. As a result, for those of us in the population that abhor choosing anything or making a decision, we welcome an easy outlet or a directive, to save us the stress of tough decisions.

As providers of a product and/or service, direct farm marketers introduce a number of decisions into the lives of their customers. Often, we want consumers/customers to "decide" to purchase some or more of our product or to "decide" to be environmentally conscious (at least along the line that we follow). We want them to "voluntarily" choose to participate in our activities or to accept our practices or buy into our systems.

While the decisions of others may seem beyond our control, we do, in fact, have a reasonable level of influence on others, provided we are creative in how we present the options.

- 1) In some senses, advocacy is a type of influential control. Advocacy brings about change (which is a decision to shift from one course to another) by stopping one action/activity and then presenting or suggesting options to redirect the activity. By presenting possible choices through raising awareness of a number of options, we provide decision outlets for those involved.
- 2) Another type of decision control is where we create a sort of trail of logic bread crumbs for people to follow towards a desired conclusion. A speaker I heard a year or so ago referred to this as *Paternalistic liberalism*, which is where you guide someone correctly to the default decision (i.e. the decision you wanted them to make all along). You "help" people along the path that you want them to take, in such a way as to make it seem like it was the only natural choice. This feels a lot like manipulation (and probably is...).

In many cases, people have a preferred decision (based on values, experience, or whatever) that they will go with, provided it is possible, accessible or simple/easy. This is where we have great influential power. If we make it easy for someone to follow through on a preferred course/decision or make an easy decision (and quite possibly on one that works for us), we all win. The customer comes away feeling like they got what they wanted/needed and you benefit as well.

Let me provide you with an example of how this works. In my community, we wanted people to recycle their cans/bottles in public locations, reducing our landfill load and reducing our environmental impact. Many people are willing to dispose of their cans/bottles in a better way and were looking for places to put their cans/bottles but wouldn't walk an extra block or more to find a receptacle. In order to encourage behaviour that people already wanted to exhibit, we placed baskets on the side of all garbage cans along the street, giving them an easy alternative to either littering or dumping their cans/bottles in a garbage can. Win win.

The same principle works for things where producers provide little extra helps to their customers. Having staff deliver a fresh picking basket to someone in the field or providing a wagon to carry the fruit can make it easy for customers do what we ultimately want; pick and buy more products. Providing pre-picked baskets of fruit or having processed products at hand to top up a purchase at the till is another example. The availability of electronic payment options also give people a chance to indulge in their impulse buying urges.

Providing these easy avenues for our customers takes a little bit of thought, a little bit of extra effort and perhaps a small investment or cost, but can have big returns in terms of economic, environmental or other goals. It is worth thinking about and making small changes. Make decision-making easy for everyone involved.

INSECT OF THE MONTH

Apple Curculio

Anthonomus quadrigibbus

Crops Affected:

Saskatoon berry, chokecherry, apple, crabapple, hawthorn, and pear

Life Cycle:

- Adults emerge around the time of flowering of Saskatoon berries in the spring
 - Found during flowering and petal drop
 - Adults feed on immature fruit and shoot tips, resulting in puncture marks
- Eggs laid in punctures at base of young fruit, near the stem, roughly 1 month after peak flowering
 - 1 egg per fruit
- Larvae feed on developing seeds within fruit, feeding on one seed after another
 - Fruit do not drop off
 - Larvae remain in the fruit until pupation is complete
- New adults emerge in mid-July; overwinter in leaf litter near host plants
- 1 generation per year

Symptoms / Damage:

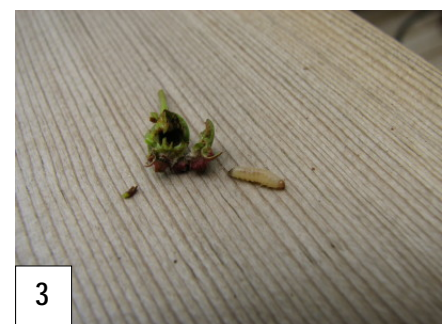
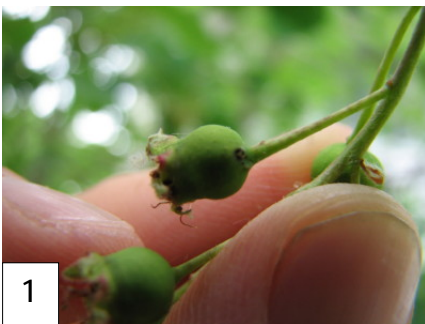
- Adult = a type of weevil; 5mm long; reddish-brown; long, curved snout
- Larvae are small and whitish, with brown heads; found in centre of ripe fruit
- Green fruit and shoot tips with distinctive dark punctures (near base of the fruit)
- Infested fruit do not drop off
- Infested fruit may be misshapen and of poor quality

Monitoring:

- Inspect plants shortly before and during fruit set for the presence of adults
- Inspect fruit for the presence of egg laying punctures

Management:

- Decis/Poleci application (3rd) just after petal drop (observe 21 day PHI)
- Removal of affected green fruit can reduce populations (very time consuming)
- Effective weed management can help keep populations down



- 1) Apple curculio oviposition hole in base of fruit;
 - 2) Apple curculio larva (early stages)
 - 3) Apple curculio larvae outside of destroyed fruit
- Photos by Robert Spencer

Rust Diseases

Causal Organisms: *Gymnosporangium nelsonii* (Saskatoon Berry/Juniper Rust); *Gymnosporangium juniperii-virginiana* (Cedar/Apple Rust); *Gymnosporangium globosum* (Cedar/Hawthorn Rust); *Puccinia asparagi* (Asparagus Rust); *Puccinia sorghi* (Common rust – Corn); *Uromyces appendiculatus* (Bean Rust); *Uromyces fabae* (Pea Rust); other pathogenic species also exist

Crops Affected: Saskatoon berry, juniper species (alternate host); also causes rust on pears and some other Rosaceous species; asparagus, corn, beans, peas, lettuce, etc.

Disease Cycle:

- Typically 2 hosts required to complete entire sexual cycle (alternate host is not always required – e.g. Asparagus rust)
 - Cycles between species
 - May also increase as specific spore types on each host
 - Symptoms may vary somewhat between spore types and/or on different hosts
- Tends to be a defoliating pathogen, reducing photosynthetic capability of the host and weakening the plant
- Depending on when the pathogen arrives on the crop (e.g. corn), it can have a varying degree of impact
- In SB/J or C/A Rust, galls on junipers or cedars (or related species) produce jelly-like orange-brown “horns” in wet springs, releasing spores
 - Typically in May-June
 - Spores can travel several kilometres to infect Saskatoon berry/Apple/Hawthorn plants
- Leaves and fruit may be infected, causing characteristic swellings and growths
- Spores produced on one host travel to complete the life cycle on the alternate host

Symptoms:

- Regardless of host species, rusts all produce some type of rusty/orange-coloured pustules and spores, although spores of other colours may be produced at different stages

Junipers/Cedars

- Globular woody galls which produce jelly-like spore bodies (horns) after rain

Saskatoon berries/Apples/Hawthorn

- Early symptoms include yellowish spots and swellings on leaves and fruit
- Swellings grow to become firm spiky outgrowths from leaves and fruit
- Twigs and branches may swell and be distorted
- Orangy rusty powder evident on and around outgrowths

Asparagus

- Pale green, stretched oval lesions form, typically near the base of the shoot, eventually turning cream to orange in colour
- Black spores produced at later stages (for overwintering)

Corn

- Orange to yellow-brown blisters appear on leaves, bursting to release rust-coloured spores

Beans / Peas (similar symptoms)

- Initially, visible as very small, white raised spots surrounded by a yellow halo
 - Red-brown circular pustules are produced on leaves, as well as petioles and pods – may be surrounded by yellow halo
 - Black spores produced for later stages

Conditions Favouring Disease Development

- Infection and spread favoured by temperatures between 10-24°C with wet plant surfaces
- Moist or rainy conditions can increase spore production and spread of infection
- Tends to be less prevalent in drier and more arid climates

Management:

- Avoid planting near native stands of evergreen hosts (Junipers/Cedars, etc.)
 - Remove junipers or prune out galls from infected evergreens within approximately 1-2 km of orchards – fairly impractical in areas where rust is prevalent
 - Removing volunteer or wild hosts near cultivated crops can reduce inoculum (e.g. asparagus)
- Remove infected leaves and debris, to try and reduce inoculum
- Ensure that there is good air circulation in crops
- Irrigate early in the day, to encourage drying prior to nightfall
- Tolerant cultivars may be available for some crops (e.g. asparagus, bean)
- Plant early to time crop development to ensure crop is beyond economic impact stage when infection occurs (e.g. corn)
- Rotations to non-host crops can be effective for the management of some rust diseases (e.g. bean) but not others (corn)
- Apply registered protective controls during late May – mid June