

SUBMISSION FROM TRISH MACFARLANE

To:-

The Hon Rosemary Armitage MLC

Hon Ivan Dean MLC

Hon Kerry Finch MLC

Hon Tania Rattray MLC

Hon Josh Willie MLC

Thank you for the opportunity to provide you with information in relation to the Blueberry Rust Inquiry. I have provided you with information in good faith and to the best of my knowledge. I hope that you can appreciate that I have presented it to you as best I can given that my job is firstly a mother, followed closely by a farmer, but I am definitely not a report writer nor a lawyer. I am just a concerned farmer who is trying to protect hopefully their future livelihood. Thank you once again.

1. Actions taken by Biosecurity Tasmania to address the 2014 and 2016 outbreaks of blueberry rust.

- 2014 incident handled completely differently to the 2016 incursion and the 2017 incursion.
- Outbreak 2014/2015 – Retail Nursery stock. Eradication achieved due to plants being forcibly removed at two growers premises by Biosecurity Tasmania (BT) as well as plants being removed from private residents backyards. The argument from some may be that there are still plants in residents backyards, but given the protected growing conditions prior to being offered for sale, that this particular variety is specifically suited to NSW growing conditions and the fact that blueberries prefer acid soils, the question is how many of those plants are actually still alive that were not able to be recovered by BT? Numbers of plants that were not accounted for have never been disclosed.
- 2014/2015 outbreak plants were removed from many residential properties. We are aware of instances where residents have contacted Biosecurity seeking details as to whether their plants contained rust or not. After many phone calls asking for updates these have still never been returned to our knowledge.
- Yearly inspections of farms prior to each season commencing to determine whether we have blueberry rust or not. Thanks must be given to the ground staff of BT on their ability to undertake a very difficult task.
- Curtain lifted on exports/imports July 2016 – declaration of blueberry rust-free status again.

- Outbreak August 2016 – Sulphur Creek Facility – major corporate company. I personally found out about the outbreak through the DPIPWE Alerts System as a message was sent to my e-mail address. No eradication attempt made. Biosecurity shut down facility and locked gates. My understanding is that BT attempted to put in place biosecurity on-farm measures to prevent the spread of the disease and these measures have been constantly challenged. This has resulted in changes to forced measures that should have been put in place in the first instance. Not sure how Biosecurity Tasmania made the decision to change their stance as far as their methodology in the handling of this incursion was concerned, but they did.
- Not the whole farm was affected. 4 out of 11 blocks and only the “Evergreen system” according to advice provided by Biosecurity Tasmania at a meeting at Mount Pleasant with a small number of industry members.
- Also at the Mount Pleasant meeting growers were asked to contribute information to Macquarie Franklin and that we would be provided with a copy of the report. To this date we haven’t received a copy. An independent blueberry grower has managed to obtain a copy of this report through “Right To Information” October 2017.
- Overall costs of maintenance/eradication – who determined that maintenance was more cost effective and to whom was it more cost effective?
- September 2016 – Plants were sighted at Woolworths Legana Supermarket by a grower and a photograph of these were passed onto Biosecurity. They were subsequently collected and tested and the grower has been unable to ascertain results of which form of Rust these were carrying.
- Outbreak March 2017 – two small farms within 8 kms of the Sulphur Creek facility and well within the containment 20-25km zone Biosecurity put in place. There was absolutely no notification to the industry of the outbreak by Biosecurity Tasmania, and the whole situation was kept extremely quiet. Biosecurity Tasmania alerts system was also turned off.

2. Past and present regulatory requirements relating to the blueberry industry in Tasmania

Free trade up until 2014 outbreaks as we had no pests or diseases present in the state that would prevent us from shipment.

After 2014 outbreaks – “Property Freedom” with yearly inspections by BT from then until we were declared “Blueberry Rust Free” in July 2016.

Outbreak in August 2016 resulted in restricted trade again. No guaranteed access to Victoria, South Australia and Western Australia.

Fantastic effort by one particular staff member within BT for the 2016 and 2017 seasons to enable market access on behalf of all growers. 2016 Property inspections resulting in “Property Freedom” for those of us without blueberry rust.

Stricter import conditions were implemented for the 2017 season which resulted in farmers having to send more detailed export documentation and shipments had to be completely shrink wrapped prior to shipping.

2018 season - We are now for the third year in a row asking for amendments to be made to the import requirements for Victoria, South Australia and Western Australia. We are waiting on advice from BT as to whether these are going to come through. If we are having difficulties this year in market access, I just wonder how much more difficult it will become in future years.

3. The future of Tasmania's blueberry industry, including the impacts of previous, current and any future outbreaks of blueberry rust.

2014 – two small commercial farms were completely destroyed.

Future of industry:-

Pick your own farms have little to no way of protecting their farms.

Organic farms have no access to proven non-fungicidal treatments. At present spray regimes or "Property Freedom" will most likely provide market access, but this will be on a year by year basis. Organic growers will lose their certification should they be forced to or have no other option to treat the rust to use non-organic treatment processes.

Premium prices for Tasmanian fruit due to our pest-free, disease-free, clean, green image, which has always been the case, will be affected. A complete "levelling of the playing field". Should the rust stay in this state it will severely jeopardise our prices as access to markets will be limited and prices will continue to drop for everyone in an already flooded market. Both Conventional and Organic growers obtain a premium price for their fruit. This will also affect the Tasmanian market as there will be a lot more produce marketed in this state and prices will also be affected.

Yearly inspections are currently funded by BT, but according to the DPIPW website there are now 3 inspections required each season. How long is this expense going to be covered by BT before it gets passed onto the grower?

Market access at this stage is only for transshipment through Victoria to NSW and QLD. We do not have access to Victoria, South Australia or Western Australia currently and this will be the third season that we will be asking for trade condition exemptions to be made. What ongoing ramifications for international market access?

If interstate markets are closed this will put pressure on our local markets. Just how many pick your owns can this state support?? In addition, if we are only able to send to two markets i.e. NSW and QLD, how much fruit can those two states absorb before it becomes financially unworkable? This year market prices have dropped substantially due to the volume of production in NSW.

Tasmania is the second largest producer of Blueberries in Australia behind NSW.
Australia imports around 1200 tonne of blueberries from other countries – Why?

Additional pressure placed on independent owners to more stringently scrutinise prospective employees to ensure they haven't previously been working at another infected farm whether it be here or from the mainland. This also applies to any external third party company required to work at any of the infected properties.

Most smaller operators are not setup for spraying regimes. So not only are the setup costs for this expensive, it is also time consuming and a lot of the farms are not set out on terrain that is conducive to equipment such as a tractor.

4. The capacity of Biosecurity Tasmania to manage blueberry rust outbreaks and other risks into the future.

Guidance being relied upon by Biosecurity Tasmania from NSW authorities who are well versed in growing conditions for NSW and these are not relevant in Tasmania as varieties grown and climate is completely different.

The constant poor knowledge and misinformation provided by Biosecurity Tasmania informing growers of circumstances and then completely contradicting the original comments. For example 2 new infected properties in 2017, firstly stating that they had deciduous varieties, secondly that they had some evergreens and thirdly that it was stated at the Biosecurity On-Farm Hygiene Workshops (both at Grove and Exeter) that the two farms concerned definitely only had deciduous varieties.

TIA were not consulted until July 2017 and they subsequently provided a report. Why were they not consulted prior to this?

Biosecurity Tasmania in my opinion have not determined exactly what size the Tasmanian industry is. The number of Blueberry growers originally according to Biosecurity Tasmania amounted to 58. We have now managed to identify around 80 growers with approximately 20 of those certified organic (or in-conversion).

Meetings with Independent Blueberry Grower representatives, TFGA and PIBAA with BT have not resulted in Biosecurity Tasmania changing their minds on eradication. They have been presented with a multitude of scientific data together with defoliation options and have taken months to draw the same conclusions, with no consideration given to possible trials.

Please note: Advice on Biosecurity Tasmania website advising that the Blueberry Rust disease was now endemic and would be removed from the Exotic Pests and Diseases Register without consultation with industry, was discovered by growers on the DPIPWE website post FGT conference in May 2017. This was taken down from the website after written and verbal complaints to various Ministers by growers. Copy of screen shown below:-

Blueberry rust

On this page

- [Blueberry Rust Update May 2017](#)

- [What is blueberry rust?](#)

- [What to look for:](#)

- [How does blueberry rust spread?](#)

- [What to do if you suspect you have an unusual plant disease. Ways you can protect your crops](#)

Blueberry Rust Update May 2017

Blueberry rust was found on a North-West property in August 2016. It has since spread to two smaller nearby properties (detected March 2017).

Because the incursion is of a much larger scale than a previous one eradicated in 2015, a containment and ongoing management strategy was adopted to address the disease through the past growing season.

The focus of the management approach is now reducing the risk of further movement of the disease, and provide time for local industry to meet requirements to enable interstate market access over the last season.

As this disease is now considered established in Tasmania, Blueberry rust will be de-regulated as a disease exotic to Tasmania in coming months. The industry will be informed of any changed conditions of trade.

The Department will continue to work closely with blueberry industries in coming months as well as interstate authorities to maintain future domestic market access.

What is blueberry rust?

Blueberry rust (*Thekopsora minima*) is a serious disease of blueberries that causes extensive defoliation and may cause plant death on plants with severe infections.

Blueberry rust is a fungi and is classified under Tasmania's *Plant Quarantine Act 1997* as a List A disease.

What to look for:

- Initial small yellow, chlorotic leaf spots on upper surface of young leaves
- Lesions turn rust/brown coloured and enlarge as the infection progresses (*Fig 1.*)
- Yellow-orange powdery pustules develop on the underside of leaves (*Fig 2.*)
- Similar pustules may also appear on blueberry fruit (*Fig 3.*)
- Premature leaf drop and defoliation



(Click to enlarge images)

When do symptoms first appear?

In the field, the symptoms appear on leaves by mid-season at any growth stage of plants and on fruits by late season.

How does blueberry rust spread?

The disease spreads by airborne urediniospores mainly via wind. In glasshouse environments, urediniospores can be carried by people, on clothing for example, when walking past and contacting plants.

What to do if you suspect you have an unusual plant disease.

It's very important that you not disturb or move the plant. Care should also be taken to ensure that any clothes or equipment has not become contaminated. You should, as soon as possible, phone the plant disease hotline on **1800 084 881** and report the symptoms noticeable on the plant.

Ways you can protect your crops

Adopt a range of farm biosecurity measures that will assist in protecting your property from the entry and spread of various pests and diseases. Farm biosecurity is a shared responsibility, and that of every person visiting or working on your property.

- Ensure you and your staff are aware of plant diseases, and are familiar with symptoms
- On-site disease identification information should be on-site and be easily accessible
- Limit the access of people (visitors and staff) onto your property
- Disinfect all equipment/vehicles that move off-site and return to operate on the property
- Implement a hygiene protocol for essential visitors (contractors, suppliers, etc)
- Restrict all non-business vehicles from entry onto the property
- Minimise or allocate specific staff who might come in contact with host material
- Source plant material from known professional growers with good accreditation
- Inspect imported blueberry host material prior to introduction to your property

Further Information

For detailed information, together with a range of farm biosecurity resources that will assist in protecting your property – and livelihood – visit the [Farm Biosecurity Program website](#) (the Program is a joint initiative of Animal Health Australia (AHA) and Plant Health Australia (PHA)).

Download the blueberry rust fact sheet.

Remember if you suspect that your plants may be infected with a new disease please call **Biosecurity Tasmania on 1800 084 881** Biosecurity.planthealth@dpiwve.tas.gov.au

5. Any other matters incidental thereto.

Material Safety Data Sheets on chemicals currently being used and proposed “future use chemicals”.

ABGA (Australian Blueberry Growers Association) did not advise their members directly about the 2016 incursion. It was only posted on their facebook page (16th of August) after a written complaint message on their page was left by a concerned Tasmanian grower on the 14th of August, 2016. They did not send out any e-mails directly to their members.

Victoria have had their BBR free status reinstated despite there being no water dividing them from the NSW border together with the constant flow of people and transport between the two states.

Evergreen plants and defoliation process every season. Defoliation helps to reduce inoculum which in turn if you then use fungicide sprays this will hopefully lead us to eradication. The process of Electrolysed Water to be further investigated.

Rosalie Daniel report (BB13002) and presentation at 2017 FGT conference with supporting evidence that eradication is a possibility given different growing conditions. No trials have been suggested nor attempted as a way forward by Biosecurity Tasmania.

We would very much like to be provided with a copy of the “Key Activities Report for the Primary Industries and Water portfolio dated 8 February 2017, specifically, the 'Blueberry Rust Update'” as we feel that this will give us some additional information into the handling of this matter.

Consideration be given to feasibility of banning future importation of evergreen varieties into Tasmania (Peter Cross – Chief Plant Pathologist mentioned at the Biosecurity Workshops here in Grove and Exeter in September 2017 that he would personally like to see no evergreens in this state at all).

Workers can transfer rust on their clothing (particularly denim), hats, balaclava's, etc. The spores can remain viable for up to 2 weeks on these types of clothing. So hygiene practices across the entire workforce (including management) needs to be diligently undertaken.

Purchase of the Nixon property (Lebrina) by Costas. Settlement day was the day of the industry meeting with Biosecurities at Mount Pleasant in August 2016. This property at the time was one of the largest independent growers here in Tasmania.

Personal emails to me from Australian Certified Organic and NASAA with information particularly relevant to the Tasmanian blueberry industry. Please note that there are growers who are registered with other Organic and Biodynamic certifying bodies. I have not had the opportunity to contact them yet.

ATTACHMENTS:-

ORGANIC CERTIFICATION INFORMATION:-

Information for Meeting

Bradley Elizabeth <elizabeth.bradley@aco.net.au> Jun 13

to me,

Hi Trish,

Kate passed on your request for information to me.

The Australian Organic Market Report 2017 puts the Australian organic Industry as a \$1.72billion export market and \$696million domestic trade worth.

There are 13 organic blueberry growers in Tasmania (with ACO) and in total Tasmania has 4% of the organic farmers in Australia. I cannot give you figures on what the value of organic Tasmania blueberry farms are as I don't have this information.

I am also limited to what information I can share about ACO clients due to confidentiality.

You can access the Australian Organic Market Report 2017 by visiting the Australian Organic website here: <http://austorganic.com/ao-market-report/>

I hope this helps!

Kind Regards,

Elizabeth Bradley, B. Environmental Health

General Manager - Certification

Australian Certified Organic

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<http://austorganic.com/lets-promote-you/>

Please be green and think before you print

Look out for the monthly Australian Certified Organic News in your inbox - it keeps you up to date with important certification news on www.aco.net.au

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Inbox X



Mark Anderson <Mark.Anderson@nasaa.com.au> Jun 26

to me, Steve

Hi Trish,

1. As I said there are 4 organic blueberry producers on our books in Tassie.
2. Total tassie blueberry sales estimated at between \$2.7 and \$3 million
3. Total organic industry in Tassie by dollars - \$13.6 million – not including Bellamy's who publically state turnover of around \$`140m.

Hope this helps.

m

Mark B Anderson
General Manager



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Thinking Sustainability? Think NASAA, Australia's First Organic Certification Organisation

Please take note in particular to the “Abstract”. Particularly rust affected cultivar.

Adaptability of blueberries to lower chill growing regions in Australia

J. Scalzo, G. Wright and S. Boettiger

Costa Berry Category, Range Road Corindi Beach, NSW 2456, Australia.

Abstract

Blueberries (*Vaccinium corymbosum*, *V. corymbosum* hybrids and *V. virgatum*) are commercially produced in Australia. In the last 30 years, cultivation has intensified in the subtropical area of Corindi, New South Wales (30.0167°S; 153.2000°E), in a banana growing area. Within the *Vaccinium* species available internationally, 30 years ago, there were some cultivars that required mid to high winter chill to break buds and very few that could break buds with low chill. One of the low chill *Vaccinium* genotypes ('Sharpblue') in the area of Corindi adapted to grow as evergreen plant and produced autumn, winter and spring crop when compared to deciduous cultivation. Evergreen blueberry plants do not undergo dormancy and retain fully active and functional leaves throughout the year. One of the benefits of evergreen cultivation is production of an out of season crop (winter/early spring) which is valuable for Costa Berry Category. 'Sharpblue' continued to be the most profitable cultivar in Australia for nearly 20 years, until leaf rust arrived in the area in early 2001. 'Sharpblue' is now severely affected by leaf rust, resulting in defoliation of the plant and also reduces its ability to produce fruit over long periods of the year. When growing 'Sharpblue' commercially was no longer an option, we had to look for alternative cultivars and genetics and we started our own cultivar improvement program at Corindi, Australia. Many years of further work will be required to consolidate this adaptation and to resolve some new issues in relation to crop management and harvest programming of evergreen blueberry.

Keywords: *Vaccinium corymbosum*, *V. corymbosum* hybrids, *V. virgatum*, evergreen, low chill

BLUEBERRY ESTABLISHMENT IN SUBTROPICAL AUSTRALIA

Blueberries (*Vaccinium corymbosum*, *V. corymbosum* hybrids and *V. virgatum*) have been commercially produced in Australia for the last 30 years, and cultivation has intensified in the subtropical area of Corindi, New South Wales (30.0167°S; 153.2000°E) which was traditionally dedicated to cultivation of bananas. The town of Corindi is located in northern New South Wales (NSW), Australia. Costa Berry Category, a division of the Costa Group, operates a farm near that town. The climate is wet sub-tropical, however being only 5-7 km from the coast and on a coastal escarpment there is a climatic buffering effect that comes into play; resulting in milder extreme temperature than further inland not very severe freezes (Figure 1). The farm has poor soils that are often duplex in nature; rock or clay subsoil with a thin layer of topsoil. Rainfall and humidity are also quite high. Pest pressures are high with numerous introduced and Australian native pest problems. Disease pressure is quite high in this environment with stem blight (*Botryosphaeria* spp.), Phytophthora root rot, leaf rust (*Pucciniastrum vaccinii*), anthracnose fruit rot (*Colletotrichum acutatum*) and grey mould (*Botrytis cinerea*) as the most important. As a result of these adverse conditions, it is a difficult growing environment for blueberry.

Corindi is a low chill site with 250-350 chill hours per annum. When blueberry cultivation was introduced to this area in 1984 (Wright, 1993), there was a large range of cultivars that required higher winter chill to break buds (>500 h) and a very limited choice for low chill production.

Amongst the medium chill *Vaccinium* varieties available at the time, rabbiteye (*V. virgatum*) were popular. The cultivation of rabbiteye cultivars in the Corindi area showed



that the plants were reasonably vigorous; however, the crop occurred in a time of the year (December-January) when southern hemisphere market competition is at its peak. Picking conditions in those months of the year are also disruptive, with frequent rain events, with the consequences of poor fruit quality and high incidence of fruit cracking.

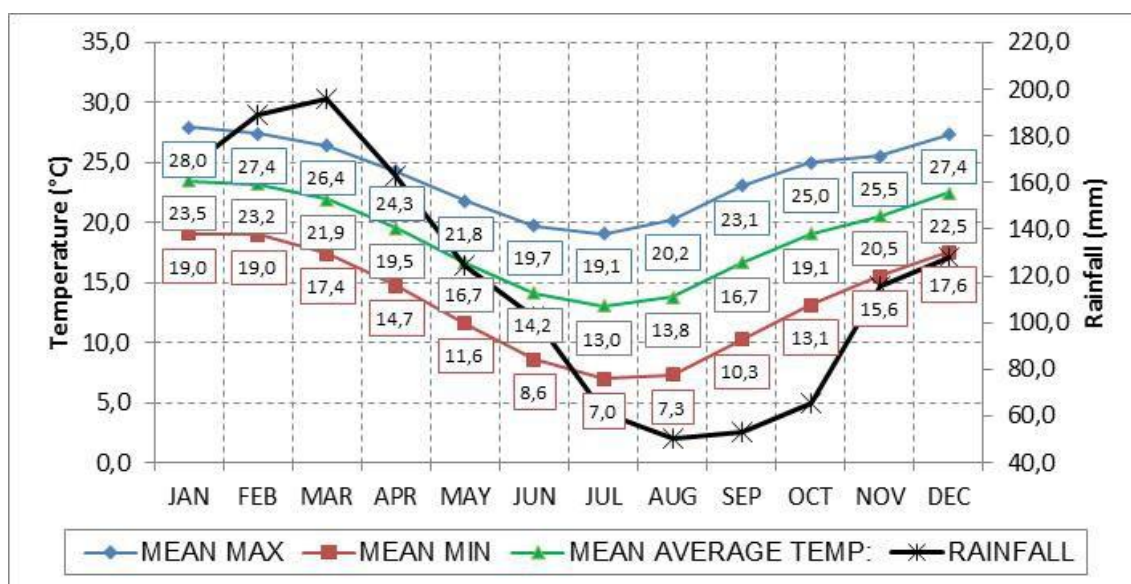


Figure 1. Climate data for Corindi: mean of 20 years from Corindi weather station.

In the early 1980s 'Sharpblue' (*V. corymbosum* hybrid) was the only one successful low chill *Vaccinium* cultivar adapted to the Corindi production region (Wright, 1993). 'Sharpblue' grew as evergreen, as the winter temperature did not go low enough to cause defoliation, and produced a continuous crop through the year, peaking in November.

'Sharpblue' showed good adaptation to the local climate, being a strong plant with good yield and despite the large picking scar on the fruit, it continued to be the most profitable cultivar for nearly 20 years, until leaf rust arrived in the area in early 2001. 'Sharpblue' is severely affected by leaf rust, resulting in defoliation of the plant and hence severely reduced its ability to produce fruit over long periods of time. When growing 'Sharpblue' commercially was no longer an option, we had to look for alternative cultivars and new genetic and Costa started its own cultivar improvement program at Corindi.

The availability of other cultivars from overseas breeding programs around the same period also contributed to make 'Sharpblue' obsolete. The newly introduced cultivars adapted, to various degrees, to the subtropical climate of Corindi. Some *Vaccinium* were deciduous and produced a mid-season crop, while the best adapted lines grew as evergreen through the winter.

EVERGREEN BLUEBERRY

Evergreen blueberry plants do not undergo dormancy and retain fully active and functional leaves throughout the year. The horticultural management of evergreen blueberry plant is therefore different from that of a deciduous plant.

The leaves have to be maintained fully active and functional throughout the year with constant fertilizer application in order to support the development of quality fruit.

In Corindi, evergreen blueberry plants ripen 'this year crop' on 'last year leaves'. In some cultivars a significant proportion of the berry crop is harvested before significant new leafing occurs. The remaining proportion of the crop is harvested when the new leaves appear in late winter/early spring (August to September).

The out of season crop in winter and early spring is valuable for us. Production of high yield at this time of the year requires that the plants have an abundance of healthy leaves

during the majority of the fruit development period and, ideally, a short bloom to ripe interval. Plant bloom in late autumn mid-winter and, since killing freezes are unusual and winter temperatures are warm enough to promote flowers and fruit development, the berries ripen in early winter and early spring (June to October). Evergreen blueberry plants can mature a winter/early spring crop by carrying the previous year's leaves, then the new leaf growth occurs prior to completion of harvest. In some cultivars this happens mid-way through the harvest, in other the new leaves are formed towards the end of the harvest. We have experienced that when evergreen blueberry plants start producing new leaves during the peak fruit harvest, the fruit quality decreases.

The berry crop from evergreen blueberry plants is the earliest that is harvested at Costa Berry Category farms at Corindi, compared to other highbush and rabbiteye cultivars cultivated at the same location (Figure 2). Figure 2 shows the total blueberry crop that was harvested during the year 2013 and it is expressed as the harvest percentage (%) reached at each month for each blueberry type. Within evergreen blueberry, a little crop is harvested from April to August, however, the majority of the berries are harvested during the month of September (~47% of the total crop). The rest of the highbush cultivars produce a later crop which peak is reached in October and November. The rabbiteye crop reaches its peak in December.

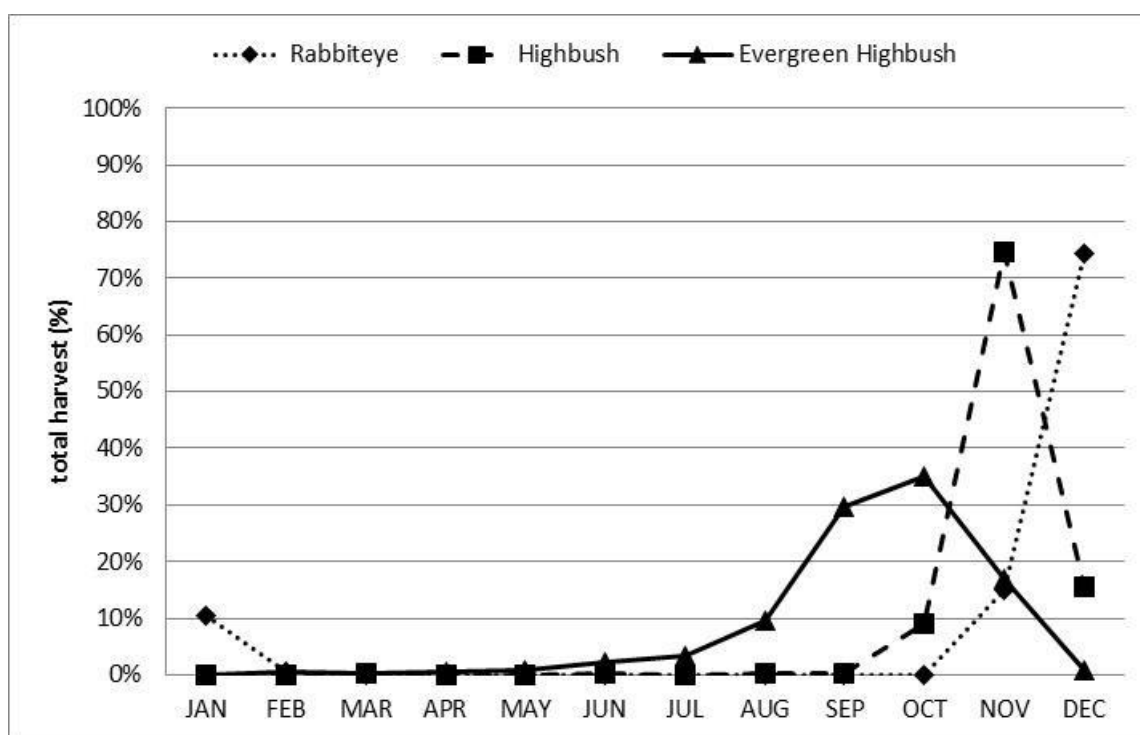


Figure 2. Total blueberry harvest for the 2013 year at Corindi. The total harvest is expressed as the harvest percentage (%) reached at each month for each blueberry type (i.e., rabbiteye, highbush and evergreen highbush).

In Figure 3 the percentage of total fruit harvest of three low chill evergreen highbush cultivars (C97-390, C99-042 and 'Snowchaser') is compared to that of the deciduous highbush 'Star'. The majority of the crop (~87%) from the former cultivar is harvested in November while the evergreen crop is long-drawn-out to the point that the harvest is not cost-effective.

Consequently, soon after the fruit harvest is finished, evergreen blueberry plants are pruned. The new growth that comes after pruning persists through the summer, and the leaves are kept until the subsequent winter. The cycle continues with the 'old' leaves (previous season) supporting the berry crop in winter/early spring. The evergreen

production system as described previously allows us to harvest berries at least one month earlier than from low chill deciduous cultivars.

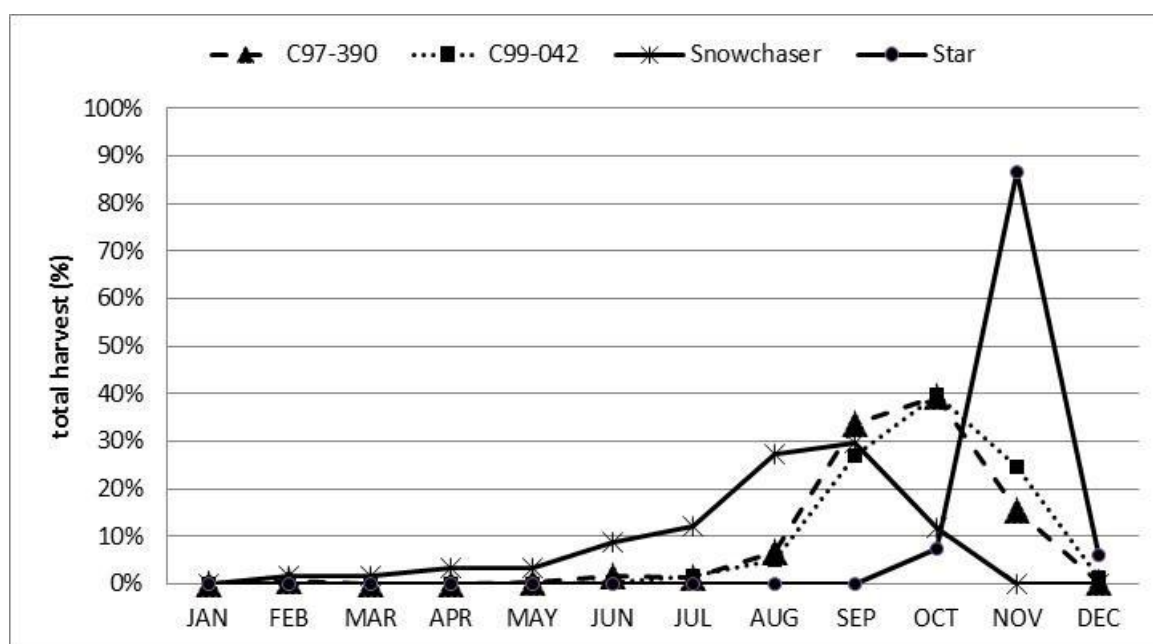


Figure 3. Total blueberry harvest for four cultivars at Corindi in 2013. The total harvest is expressed as the harvest percentage (%) reached at each month for each blueberry cultivars. In Corindi, the cultivars C97-390, C99-042 and 'Snowchaser' are evergreen highbush and 'Star' is a deciduous highbush.

ISSUES WITH EVERGREEN BLUEBERRIES

After the fruit is harvested, the plants continue growing through the summer. The new growth has to be kept healthy from leaf disease during the summer when the temperature and humidity are high, conditions that favour leaf diseases such as rust. Disease pressure is quite high in this environment with *Botryosphaeria* spp. and *Phytophthora* spp. in addition to rust, which limits plant health and field longevity. The cultivar choice before planting large blocks of evergreen blueberries is therefore focused on reasonable resistance to plant diseases and poorer soil conditions.

Low chill evergreen blueberries have a long, protracted harvest season. Flowering, fruit set and crop maturation may happen at the same time to various degrees on an evergreen plant. When this is the case, the harvest timing and the total yield of the cultivar are hard to predict. In addition there is a limited possibility to machine harvest an evergreen blueberry plant that does not concentrate the fruit ripening in a short time.

CONCLUSIONS

One of the most effective adaptations of blueberry to the low chill region near Corindi is seen in cultivars with a strong tendency to remain evergreen throughout winter. This has benefits of producing an out of season crop (winter/early spring) which is valuable for us. However, many years of further cultivar improvement work will be required to consolidate this adaptation and to resolve the related new issues of crop management and harvest planning.

Literature cited

Wright, G. (1993). Performance of southern highbush and rabbiteye blueberries on the Corindi plateau NSW Australia. *Acta Hort.* 346, 141–146 <http://dx.doi.org/10.17660/ActaHortic.1993.346.19>.

Please note: Transmission details – spread by wind (up to several hundred metres – not kilometers), plants and fruit, people, packaging and equipment.

<http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds/plant-diseases/fruit-and-nuts/berry-diseases/blueberry-rust/about-blueberry-rust>

About blueberry rust

What does it look like?

The initial symptoms of blueberry rust are reddish spots on the upper surfaces of young leaves (Figure 1 left). These lesions darken with age, often surrounded by a yellow halo, and may merge as the disease progresses (Figure 1 right). Infected leaves may curl.



Figure 1. Blueberry rust symptoms on the upper leaf surface: (left) rust-coloured lesions; (right) advanced infection showing merged lesions. (right-hand image courtesy of College of Tropical Agriculture and Human Resources Hawaii)

On the undersides of the leaves, yellow pustules develop (Figure 2) to release spores capable of infecting other leaves and spreading the disease.



Figure 2. Blueberry rust symptoms on the underside of a leaf, showing yellow pustules

In severe cases, leaves can turn brown and drop prematurely. This defoliation reduces plant vigour and, in the following year, crop yield. Serious defoliation may lead to the death of susceptible cultivars.

Rust spores may be found on other parts of the plant (such as fruit and stems) if they become dislodged from the pustules.

Which plants does it affect?

Blueberry rust is a fungal disease of a range of plants in the Ericaceae family, including the genera:

- *Vaccinium* spp. (blueberries and cranberries)
- *Gaylussacia* spp. (huckleberries)
- *Rhododendron* spp. (azalea)
- *Lyonia* spp.

Conifer hemlocks (*Tsuga* spp.) are the alternative hosts which the rust requires to complete its lifecycle in colder climates. These species are believed to be uncommon in Australia, but in mild climates such as Australia's the rust can survive without completing its life cycle.

To date, blueberry rust has only been reported on blueberries (*Vaccinium* spp.) in Australia. Southern Highbush varieties and their cultivars are more susceptible to the disease than other varieties - see [Management of blueberry rust](#).

How does it behave?

Blueberry rust has up to five life stages and produces different spores at each stage.

New pustules can be produced and release spores every 10-14 days, with more rapid spore production occurring under favourable climatic conditions. The optimum temperature for spore production is around 21°C, but new infections are unlikely when the temperature is over 30°C.

The rust can overwinter on evergreen blueberry leaves in milder climates, but is more prevalent in warm, wet conditions.

The millions of spores released from the pustules are very easily and quickly transported by wind (up to several hundred metres), but can also be spread via infected plants and fruit, packaging, equipment, clothing and hands.

The spores are able to re-infect the original host plant as well as other blueberry plants and other host species.

Where does it occur?

Blueberry rust has been reported in Europe, Asia and the Americas. In Australia, it has been present in New South Wales and Queensland for many years.

Extract from Fruit Growers Tasmania Facebook page.

[Fruit Growers Tasmania](#) added [3 new photos](#).

[August 15, 2016](#) ·

With the recent outbreak again of blueberry rust in the north-west, FGT are providing the linkages between growers, Biosecurity Tasmania, Government and the incident. A meeting is proposed to be held in Launceston on Thursday afternoon with times/place to be announced.

Ian from FGT has provided this fact sheet for all growers with a PDF version :

What is blueberry rust?

Blueberry rust (*Uromyces minimum*) is a serious disease of blueberries and causes severe defoliation on heavily infected plants.

Blueberry rust is a heteroecious fungus (requires 2 host species to complete a life cycle). Other hosts have been reported to include *Tsuga* spp. (Hemlock), *Rhododendron* spp. (Azalea and Rhododendron) and *Gaylussacia* spp. (Huckleberry), amongst others. The susceptibility and significance of these hosts has not been confirmed in Australia.

The mode of infection occurs when the fungus spores germinate on the leaf surface and root-like structures called germ tubes, penetrate and infect living plant tissue. The fungus will continue to grow within the plant tissue and depending on optimal conditions (20-25°C), will produce the yellow rust pustules in 7-21 days. Spores from the pustules are spread by wind (in the presence of water from rain, dew or overhead irrigation), re-infecting other blueberry leaves.

What to look for:

- * Initial small yellow, chlorotic leaf spots on upper surface of young leaves
- * Lesions turn rust/brown coloured and enlarge as the infection progresses (Fig 1. And 2.)
- * Yellow-orange powdery pustules develop on the underside of leaves (Fig 3.)
- * Similar pustules may also appear on blueberry fruit (Fig 4.)
- * Premature leaf drop and defoliation

Ways you can protect your blueberry crop:

- * Ensure you and your staff are aware of the disease, and are familiar with plant symptoms
- * Disease identification information should be onsite and be easily accessible
- * Limit the access of people (visitors and staff) onto your property
- * Disinfect all equipment/vehicles that move off-site and return to operate on the property
- * Implement a hygiene protocol for essential visitors (contractors, suppliers, etc.)
- * Restrict all non-business vehicles from entry onto the property
- * Minimise or allocate specific staff who might come in contact with host material
- * Source blueberry host plant material from reputable professional growers that are known to be free from the disease
- * Inspect imported blueberry host material prior to introduction to your property.

Management:

Removing all alternate hosts trees from the surrounding environment would break the rust life cycle, however this is not viable method of control. The best practice is to reduce the carryover

inoculum from the previous season into the next. This can be achieved by removing infested, inoculum-bearing plant debris, such as pruned branches and leaves.

Minimizing leaf wetness by adjusting timing of overhead irrigation, maximise airflow through canopy management can also reduce the optimum growing conditions of the fungus.

Spray practices:

Rust control in blueberries currently relies largely on the use of a spray program. Selecting the appropriate fungicide and timing of application can improve disease control. A small number of protectant and curative fungicides are currently permitted for use on blueberries in NSW.

Protectant sprays:

Protectant fungicides, such as mancozeb and strobilurins, function on the plant surface to inactivate the fungus prior to its entry into the plant. These fungicides protect the surface on which they are applied. They do not protect new shoot growth after infection, and are most effective when applied just before an infection event.

Dr. Annemiek Schilder of Michigan State University, suggests that a tank-mix of a sterol inhibitor fungicide, such as Indar or Orbit, with a half rate of Bravo is another option for both protectant and curative activity. For management in Organic Operations, Serenade (*Bacillus subtilis*), an organic biofungicide with a zero-day PHI, has moderate to good activity against blueberry rust – adding a sticker-extender like Nufilm P may improve efficacy. Dormant lime sulfur applied to the leaves on the ground in the fall or spring may be helpful in reducing overwintering inoculum, but efficacy has not been confirmed.

Other suggested fungicides are:

- * Pristine (pyraclostrobin + boscalid),
- * Indar (fenbuconazole), Orbit (propiconazole)
- * Quash (metconazole)
- * Bravo (chlorothalonil)

Do keep in mind resistance build-up and the respective withholding periods. Please consult your supplier before use.