

Strawberry Strategic Agrichemical Review Process Summary

Dr Angela Atkinson, Industry Development Officer, Strawberries & Victoria/SA

Strawberry industry representatives, including growers, researchers and agronomists, met on Tuesday 2nd February 2021 to discuss the report from the Strawberry Strategic Agrichemical Review Process (SARP) recently published by Hort Innovation. The purpose of the discussion was to ensure that the report had accurately captured the pest and disease priorities of the strawberry industry and the control methods currently available, and to discuss newly emerging chemical options and identify gaps that need addressing.

The SARP involved industry consultation through an online survey, and a desktop study of current and pending chemical registrations and permits available to industry, with the aim to:

- Assess the pests, diseases and weeds affecting the industry, and prioritise them on the basis of both their impact on industry and the availability of effective control measures,
- Document all current registered and permitted chemical controls available, and assess their effectiveness,
- Identify gaps in current pest and disease control strategies; and
- Identify suitable new or alternative chemicals to address the gaps.

Outcomes of this process may include pursuing chemical registrations with agrichemical companies, or minor use permits with the Australian Pesticides and Veterinary Medicines Authority (APVMA).

Tables 1 and 2 show the disease and pest priorities identified in the SARP report. Comments from the discussion regarding the prioritisation, current and potential controls available, and industry concerns are outlined overpage. These concerns and priorities will be followed up with Hort Innovation, APVMA and/or chemical companies where appropriate.

Comments on prioritisation of diseases:

1. **Powdery mildew** is a high priority not just because it is a significant problem in all regions, but also because there are few options currently available to control it, so resistance management is difficult.
2. **Grey mould/Botrytis** is becoming more important in the runner industry as the industry moves towards more plug plant production. There needs to be more coordination between the runner nurseries and fruit growers to develop programs to manage resistance as more Botryticides are used in runner nurseries.
3. **Charcoal Rot** is a significant problem in many regions, and Methyl Bromide for use in the runner industry will eventually be phased out. Potential new fumigants were not listed in the SARP
4. **These crown and root rot diseases** are difficult to differentiate from each other and from Charcoal rot in the field without diagnostics. It was felt that these diseases were underrepresented as a result and were a higher priority.
5. **Lethal yellows** - the insect vectors of this and Little Leaf (leaf miners) should be on the priority pest list.

It was also felt that Red Leaf should be flagged in this report, so that when the cause is determined it is on the radar if permits/registrations are needed.

Disease priorities

Table 1: Disease priorities

Common name	Scientific name
High	
Powdery Mildew ¹	<i>Podosphaera aphanis</i>
Grey Mould ²	<i>Botrytis cinerea</i>
Charcoal Crown Rot ³	<i>Macrophomina phaseolina</i>
Leaf Blotch / Stem-End Rot	<i>Gnomoniopsis fructicola</i>
Leather Rot / Phytophthora Fruit Rot	<i>Phytophthora</i> spp.
Moderate	
Fusarium Crown Rot ⁴	<i>Fusarium oxysporum</i> f.s.p. <i>fragariae</i> - Fof
Root and Crown Rot ⁴	<i>Phytophthora</i> spp.
Crown Rot ⁴	<i>Colletotrichum gloeosporioides</i>
Fusarium Wilt ⁴	<i>Fusarium oxysporum</i>
Black Root Rot ⁴	<i>Pythium</i> spp., <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp.
Black Spot / Anthracnose	<i>Colletotrichum acutatum</i>
Leaf Blight	<i>Phomopsis obscurans</i>
Leaf Spot / Eye Spot	<i>Mycosphaerella fragariae</i>
Transit Rot	<i>Rhizopus stolonifer</i>
Low	
Blackberry Nightshade	<i>Solanum nigrum</i>
Marshmallow	<i>Malva parviflora</i>

New & potential fungicide registrations:

- Kenja® (Isofetamid, group 7) - is newly registered for Botrytis in strawberries
- Miravis® Prime (Pydiflumetofen + Fludioxonil, gps 7+12) - is pending registration for Botrytis, Alternaria, Powdery mildew and Anthracnose in berries
- Luna® Experience (Fluopyram + Tebuconazole, gps 7 + 3) - registration work underway through Hort Innovation project ST17000 for control of Botrytis and Stem End Rot in strawberries
- Luna® Sensation (fluopyram + trifloxystrobin, gps 7 + 11) - Bayer is doing work towards registration for Powdery Mildew and Botrytis in strawberries (was not listed in the SARP report)
- Intervene™ (Polyoxin D zinc salt, group 19) - in development by Nufarm with activity on Powdery Mildew, Botrytis and Rhizopus - will be registered for all berries
- Adavel™ (Florylpicoxamid, group 21) - new mode of action fungicide being developed in Australia by Corteva - activity on Botrytis, Powdery Mildew and Anthracnose
- Charcoal Rot - Methyl Iodide is in the process of registration for use in the runner industry only. DMDS and Dominus, have undergone some trials in strawberries and may be put forward for registration in the future.

Concerns & priorities:

- Some of the new fungicides coming onto the market are from the same chemical groups as those currently available, particularly Group 7 fungicides. New chemistries are needed to manage fungicide resistance.
- Some of the new products are co-formulations of fungicides from different chemical groups. As most fungicides have limits on the number of applications per crop, co-formulated products decrease the number of sprays of those chemical groups through the season.
- Some older chemistries do not specify use in protected cropping - follow up the possibility of adding this to labels.
- There is a need for better coordination between the runner industry and the fruit industry with regard to developing spray programs to manage the risk of fungicide resistance. Extending registration of fungicides specific to runner production into fruit production must be discouraged, unless there is a valid scientific reason. With the extension of registration for Flute® (Cyflufenamid, U6) into fruit production, a fungicide group should be considered for addition to the runner sector only.

Pest priorities

Table 2: Insect, mite, nematode and other pest priorities

Common name	Scientific name
High	
Two Spotted Mite	<i>Tetranychus urticae</i>
Western Flower Thrips	<i>Frankliniella occidentalis</i>
Moderate	
Rutherglen Bug	<i>Nysius vinitor</i>
Strawberry Aphid	<i>Chaetosiphon fragaefolii</i>
Green Peach Aphid	<i>Myzus persicae</i>
Queensland Fruit Fly	<i>Bactrocera tryoni</i>
Cyclamen Mite	<i>Phytonemus pallidus</i>
Snails & Slugs	<i>Helix aspersa, Cernuella virgata</i>
Green Mirid	<i>Creontiades dilutus</i>
Brown Mirid	<i>Creontiades pacificus</i>
Crop Mirid	<i>Sidnia kinbergi</i>
Greenhouse Whitefly	<i>Trialeurodes vaporariorum</i>
Plague Thrips	<i>Thrips imaginis</i>
Low	
Root-Knot Nematode	<i>Meloidogyne spp.</i>
Root-Lesion Nematode	<i>Pratylenchus spp.</i>
Leaf and Bud Nematode	<i>Aphelenchoides ritzemabosi</i>
Lygaeid Bugs	<i>Lygaeidae</i>
Onion Thrips	<i>Thrips tabaci</i>
Light Brown Apple Moth	<i>Epiphyas postvittana</i>
Cluster Caterpillar	<i>Spodoptera litura</i>
Cotton Bollworm / Corn Earworm	<i>Helicoverpa armigera</i>
Native Budworm	<i>Helicoverpa punctigera</i>
Loopers	<i>Chrysodeixis spp.</i>
Mediterranean Fruit Fly	<i>Ceratitis capitata</i>
Silver Leaf Whitefly	<i>Bemisia tabaci</i>
Spiralling Whitefly	<i>Aleurodicus dispersus</i>
Garden Weevil	<i>Phlyctinus callosus</i>
Green Vegetable Bug	<i>Nezara viridula</i>
Strawberry Bug	<i>Euander lacertosus</i>
Broken Backed Bug	<i>Taylorilygus apicalis</i>
Apple Dimpling Bug	<i>Campylomma liebkechti</i>
Broad Mite	<i>Polyphagotarsonemus latus</i>
European Earwig	<i>Forficula auricularia</i>
Scarab Beetle	<i>Scarabaeidae</i>

Comments and priorities:

- **Two Spotted mite** - mostly controlled with IPM, and most miticides are now ineffective, although there are some potential new products.
 - Danisaraba® (cyflumetofen, Group 25A) - BASF is seeking registration in Australia for control of spider mites including in strawberries - effective on all life stages.
 - Oberon® (spiromesifen, Group 23) - Hort Innovation project to generate residue, efficacy and crop safety data to obtain registration for TSM in strawberries (field and protected cropping) - not IPM compatible.
- **Western Flower Thrip** - available chemistry is mostly ineffective so it is generally controlled by IPM.
 - Important that chemistry used to control other pests is compatible with IPM.
- **Mirids** - a major problem in some production areas, particularly Tasmania and Western Australia, and should be a higher priority.
 - There is a need for more IPM compatible chemistry for mirids.
- **Rutherglen bug** - should be a higher priority as in some seasons it can be a major problem.
 - There is a permit for Maldison® for control of Rutherglen bug in strawberries, but it has a high impact on beneficials.

- Transform® (Sulfoxaflor, Group 9D) is registered for Green Peach Aphid and Green Mirid in strawberries and it was thought it should be good for Rutherglen bug and extending the registration should be investigated.

- **Aphids** - there are concerns over resistance, in Tasmania resistance to Pirimor (strawberries recently added to label) has been seen.
 - Versys® (Aflidopyopen, Group 9D) is the newest available chemistry listed in the report, is permitted for all aphids in both field and protected cropping, and is compatible with IPM programs.
 - Transform® (Sulfoxaflor, Group 4C) is registered for Green Peach Aphid in strawberries and Cesar are doing resistance work for GPA - it was suggested to look at extending to all aphids.

Weed priorities

The only weed specified was Wireweed (*Polygonum aviculare*), rated as a moderate priority, although it was suggested that Nutgrass (*Cyperus* sp.) could be a problem as it can damage plastic mulch.

It was agreed that it is important for industry to ensure that access to glyphosate for weed control is maintained.



Two spotted spider mite (*Tetranychus urticae*). Photo credit: Frank Peairs, Colorado State University, Bugwood.org.

For further information, or to provide any feedback, please contact:

Dr Angela Atkinson | 0408 416 538 | ido@vicstrawberry.com.au