

Chemical Update:

Strobilurin fungicides & Anthracnose

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Azoxystrobin was first registered for use in avocado by Syngenta in 2003 as Amistar®WG (wetable granule), with later registration as the soluble concentrate (SC) formulation in 2005. It was registered for control of a range of fungal diseases in many crops (including against *Alternaria* and *Cladosporium* in passionfruit), including anthracnose, caused by *Colletotrichum* spp. and stem end rot in avocado and mango.

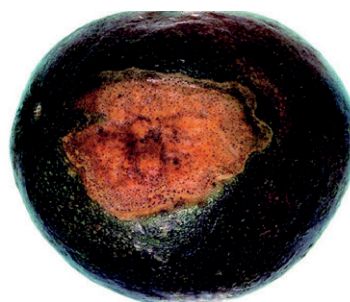
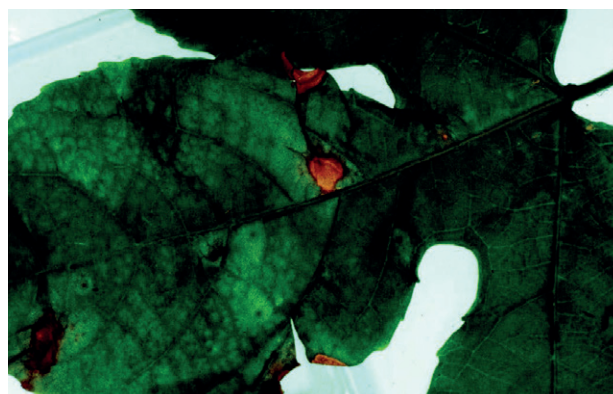
Group 11 (strobilurin or QoI) fungicides, including azoxystrobin and many others, kill fungi by targeting a specific gene involved in fungal respiration. This single-site mode of action classifies them as being "high risk", for the fungus developing resistance to its action, through genetic mutation. The longer that these single-site chemicals are used, the higher the chance that target fungi could develop resistance. For this reason, the labels for Amistar and other strobilurin fungicides, have very strict instructions for their use, as part of an anti-resistance strategy, to reduce the risk of resistance and prolong the life of the fungicide.

While these fungicides are best used preventatively, they are considered translaminar, and remain active within the leaf and cuticle of the peel for several weeks, and thus have a useful post-infection activity.

Our AV16007 project work during 2020 - 2022 showed that **pre-harvest applications of Amistar 250SC, at label rates, did not result in reduced severity of anthracnose, compared with untreated or limited copper-only controls.** This supported anecdotal evidence from several growers who felt that azoxystrobin sprays were not as effective as they once were. This suggested that *Colletotrichum* sp., the fungus causing anthracnose, had possibly mutated to become resistant to the QoI strobilurin group of fungicides.

Resistance to strobilurins is well known in *Colletotrichum* spp. causing diseases in other crops. From these previous studies we optimised a molecular test to detect the mutation, and thus screen for resistance in individual isolates of *Colletotrichum* from avocado.

So far, we have screened only a small number of isolates, but confirm that a high proportion of isolates sourced from orchards which have a history of using azoxystrobin fungicides, were resistant. Three of these are from south east Queensland, and 2 from south-west WA. This was confirmed in agar plate tests, where the resistant isolates grew very well on plates amended with high concentrations of azoxystrobin. Only 1 isolate from an orchard in NSW with history of azoxystrobin did not have the gene mutation for resistance. Isolates from pre- Amistar days (available from the QLD Dept. Agriculture and Fisheries fungal collection), and those from organic and minimally-sprayed orchards, are still sensitive to azoxystrobin, and do not have the mutation.



Anthracnose spots on leaves and fruit.

Photo credit: Passionfruit problem solver field guide

What are our next steps?

We have a very large collection of *Colletotrichum* spp. isolates from most of the growing regions, and will be screening more isolates in coming months to determine the range and extent of the resistance. Resistance will be confirmed using the molecular detection assay as well as the in vitro (agar plate) screening method.

It is likely that resistance is widespread.

It is likely that there is resistance to the whole group of strobilurin fungicides, including trifloxystrobin, one of the actives in Luna Sensation. We will be checking growth on agar plates amended with Luna Sensation.

What does this mean for passionfruit growers?

Amistar 250 SC (Active ingredient Azoxystrobin) is a Group 11 fungicide and is registered under APVMA Approval number 58340/129023 for use in passionfruit against *Alternaria* and *Cladosporium*. Although it is not registered for use against Anthracnose, it is important to understand that this chemical is subject to a CropLife Fungicide Resistance Management Strategy and it is critical that this strategy is followed by all growers.

What is fungicide resistance?

Resistance by fungal pathogens to fungicides usually evolves following the intensive use of fungicides for disease control. In any fungal population there are likely to be individuals that have some degree of natural resistance, and which are less susceptible to fungicides, even before the chemicals are used.

Resistance arises mainly through the incorrect use of fungicides, which selects for the resistant individuals. Continued use of a fungicide or fungicide chemical group can result in a significant build-up of resistant individuals in the fungal population – to the point where that particular product, or other products from the same chemical group, is no longer effective.

You can find out more about fungicide resistance at:

www.croplife.org.au/resources/programs/resistance-management

What can be done to delay or prevent resistance?

Following the Fungicide Resistance Management Strategy

Crop(s): Passionfruit

Disease(s): Alternata Spot (*Alternaria* spp.)

Resistance Management Strategy for:

Group 2 Dicarboximide; and Group 11 Quinone outside inhibitors (QoI)

1. Maintain a protective cover with a protectant fungicide such as mancozeb
2. Limit the use of Group 2 to strategic periods i.e. before, during and after extended wet periods
3. Always tank mix the Group 2 fungicide with a protectant such as mancozeb
4. Do not apply more than four Group 2 sprays in a season
5. The total number of Group 11 sprays should be no more than one-third of the total number of fungicide sprays per season.
6. Do not apply more than two consecutive applications of a Group 11 spray
7. If two consecutive applications of a Group 11 spray are applied, they must be followed by at least the same number of sprays from an alternative chemical group

Remember all crop protection products must be handled and *applied strictly* as specified on the product label or APVMA permits