

# Yellow Sigatoka (leaf spot)

*Pseudocercospora musae*

(Fungicides and top ways to manage resistance)

**Fungicides help manage yellow Sigatoka in the tropics. Now we need to better manage their use or risk losing them forever.**

Testing of leaf spot infected banana material in Far North Queensland has shown that fungicide resistance is present in the banana industry. Resistance to the strobilurins (e.g. Cabrio® and Flint®) is known to occur in most banana production areas.

There are relatively few new fungicides being registered so it's important to look after the chemicals available today so they are effective in the future. It's important for every grower to do their bit in protecting the industry. **Here are the top 6 ways to avoid or manage fungicide resistance.**

## 1. Deleaf that spotted leaf, don't spray it

The most critical part of the Sigatoka disease management program in banana is deleafing. This is also the best way to avoid or manage a resistance issue on your farm and neighbouring farms.

Fungicides are not effective on visible spots and the application of these products to infected leaf material encourages fungicide resistance. Therefore, leaf spot infected leaves should be removed before fungicides are applied.



Regular deleafing is critical for management of yellow Sigatoka.

Deleafing is important all year round however spring is the key period. Ensure all spotted leaves are removed to reduce the level of disease prior to summer. Warm and wet summer conditions favour the development of yellow Sigatoka, making it more difficult to manage.

## 2. Know the fungicide groups

Both protectant and systemic fungicides are available for the management of yellow Sigatoka. Each chemical group has a different mode of action and has an important role to play in a spray program; this in turn influences when these products should be used. Table 1 provides a complete list of fungicide groups registered for the management of yellow Sigatoka in the banana industry.

Protectant fungicides help to prevent the development of yellow Sigatoka and should form the bulk of your applications throughout the year. Mancozeb should always be applied with paraffinic oil, while chlorothalonil should never be applied with oil. Therefore growers cannot interchange between mancozeb and chlorothalonil.

Systemic fungicides used in bananas are more accurately described as being 'translaminar' which is where the pesticide passes through the leaf tissue from one surface of a leaf to the other. This means the fungicide moves below the surface of the leaf but is not truly systemic because its movement is limited. The common misconception is that systemic fungicides used in bananas can 'kill' existing disease. While they are often referred to as 'curatives' their activity is limited to early stages of the disease (stages 1 to 2b). These products have no effect on lesions beyond stage 2b (Figure 2) and the application of these products to lesions stages 3, 4 & 5 simply encourages the development of fungicide resistance.

Therefore, apply systemics when conditions are conducive to disease development (warm and wet weather conditions) and not when you can see symptoms.



**Figure 2** Stage 2b lesions on banana leaf. Systemic fungicides have no effect on lesions beyond stage 2b.

## 4. Follow the product use recommendations

There are restrictions that apply, especially to the systemic fungicides, in relation to:

- maximum number of applications per year
- maximum number of consecutive sprays of the same fungicide group
- restricted 'no spray' periods when some fungicide groups are not permitted for use

Table 2 is based on [CropLife Australia's Fungicide Resistance Management Strategy](#) for the Far North Queensland banana industry. This resistance strategy came into effect on 25 June 2015 and as product labels are renewed they will refer to this strategy.

**Table 1** Fungicides currently registered in banana crops for management of yellow Sigatoka as of September 2026. Always check registration status and product label prior to use, through the [APVMA website](#).

|                        | Activity group                                                       | Active constituent                       | Example trade name                         |
|------------------------|----------------------------------------------------------------------|------------------------------------------|--------------------------------------------|
| Protectants            | M1                                                                   | Copper in various formulations.          | Liquicop, Cop-It, Copperguard, Blue Shield |
|                        | M3                                                                   | Mancozeb, metiram and zineb.             | Dithane, Penncozeb, Polyram.               |
|                        | M5                                                                   | Chlorothalonil                           | Bravo, Whack, Unite                        |
|                        | BM02                                                                 | Bacillus amyloliquefaciens strain QST713 | Serenade Prime                             |
| Systemics              | Group 3 (Dimethylation inhibitors commonly called DMIs or triazoles) | Difenoconazole                           | Score, Digger, Ace                         |
|                        |                                                                      | Epoxiconazole                            | Opus, Soprano                              |
|                        |                                                                      | Propiconazole                            | Tilt, Bumper, Throttle                     |
|                        |                                                                      | Tebuconazole                             | Folicur, Hornet                            |
|                        | Group 7 (Pyridinylethylbenzamide)                                    | Fluxapyroxad                             | Sercadis                                   |
|                        |                                                                      | Inpyrfluxam                              | Excalia                                    |
|                        |                                                                      | Fluopyram                                | Luna privilege                             |
|                        | Group 7 & 3                                                          | Fluopyram & tebuconazole                 | Luna experience                            |
|                        | Group 9 (Anilinopyrimidine)                                          | Pyrimethanil                             | Scala, Siganax, Predict                    |
|                        | Group 11                                                             | Pyraclostrobin                           | Cabrio                                     |
|                        |                                                                      | Trifloxystrobin                          | Flint                                      |
| Plant defence elicitor | P03                                                                  | Florylpicoxamid                          | Verpixo                                    |
|                        |                                                                      | Isotianil                                | Routine                                    |

*\*Trade names are used as an example only, other products may exist, and one name is chosen for simplicity and space.*

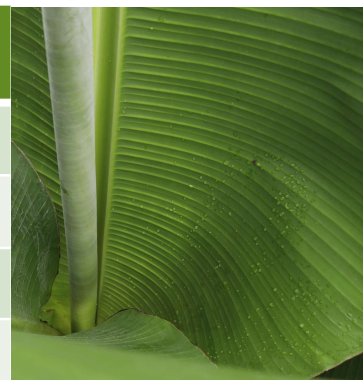
## 3. Rotate fungicide groups

There are nearly 200 trade names of fungicides registered for the management of yellow Sigatoka in banana. Know which groups the products belong to and ensure that systemic chemical groups are rotated.

It is important to rotate between the groups, not simply between products in these groups to avoid resistance. For example, switching between propiconazole and difenoconazole is not considered 'rotating' as both actives belong to Group 3.

**Table 2** CropLife Australia's fungicide resistance strategy for the Far North Queensland banana industry (Valid 14 July 2023).

| Chemical group | Maximum number of applications per year | Maximum number of consecutive sprays | Restricted (no spray) period |
|----------------|-----------------------------------------|--------------------------------------|------------------------------|
| 3              | 6<br>(and no more than 2 of 3 sprays)   | 2                                    | June to Sept inclusive       |
| 7**            | 4<br>(and no more than 1 of 3 sprays)   | Not allowed                          | June to Sept inclusive       |
| 9              | 6<br>(and no more than 2 of 4 sprays)   | 2                                    | No restriction               |
| 11**           | 2<br>(and no more than 1 of 3 sprays)   | Not allowed                          | May to Sept inclusive        |



**\*\* IMPORTANT** – Resistance to yellow Sigatoka in banana amongst products in Group 7 and Group 11 has been recognised and documented by CropLife Australia. Group 7 and Group 11 products must only be applied in a mixture with another fungicide from a different activity group, registered for control of yellow Sigatoka, at the full registered rate. Each fungicide included in the mixture counts towards the maximum number of spray applications allowed for Group 3 or Group 9 fungicides.

A resistance strategy is also available for areas outside of Far North Queensland. Refer to [CropLife's website](#) for details.

## 5. Use the recommended label rate

The application rates listed on the product label have been proven through field efficacy trials. Therefore, halving the rate to save money puts the fungicides under adverse pressure and increases the risk of a build-up of a resistant population of spores.

Always check the label for the correct application rate, as different trade names may have varying amounts of an active ingredient. For example, the active ingredient propiconazole (Group 3) appears in over 50 products registered for yellow Sigatoka management in bananas, and amongst this list are 4 different concentrations of the active ingredient.

## 6. Thorough spray coverage

For the fungicide to have the best chance at protecting the leaf from further infections, thorough spray coverage is required. This is especially important for the protectants which only work on the leaf area they come into direct contact with, and as already mentioned, the systemics have limited ability to move within the leaf.

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