Minutes of the FRAC OSBPI Working Group Meeting

4 April 2022 – 13:00 to 17:00

Virtual meeting

Participants

Corteva	Jean-Luc Genet (Chair)
	Olivier Couery
	Mamadou Mboup
Syngenta	Helge Sierotzki
	Stefano Torriani
	Santiago Valdes
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Bayer	Jürgen Derpmann (excused)
	Andreas Mehl
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Introduction

A FRAC OSBPI Working Group was formed in 2015 to generate common resistance management recommendations for the fungicides oxathiapiprolin and fluoxapiprolin. OSBP fungicides are active against oomycete fungi and used for the control of Phytophthora and downy mildews of numerous crops. OSBPIs inhibit an oxysterol binding protein (OSBP) homologue. Oxysterol binding proteins are implicated in the movement of lipids between membranes, among other processes. Inhibiting OSBP may disrupt other processes in the fungal cell, such as signaling, maintaining cell membranes, and the formation of more complex lipids that are essential for the cell to survive.

Oxathiapiprolin and fluoxapiprolin are cross-resistant.
OSBPIs have been classified under the FRAC Code 49. The resistance risk is medium to high.

FRAC Code	Target site and code	Group name	Chemical group	Common name	Comments
49	F9 lipid homeostasis and transfer/ storage	OSBPI oxysterol binding protein homologue inhibition	piperidinyl-thiazole-isoxazolines	Oxathiapiprolin Fluoxapiprolin	Resistance risk assumed to be medium to high (single site inhibitor). Resistance management required. .

Anti-Trust Guidelines (from FRAC Constitution) were shown before meetings started.

OSBPI Minutes of the 2022 discussions

Review of sensitivity monitoring 2021

Grape downy mildew (*Plasmopara viticola*)

Data presented by Bayer, Corteva and Syngenta

In 2021, sensitivity data have been generated for samples originating from Austria, Bulgaria, China, Croatia, Czech Republic, France, Germany, Greece, Hungary, Italy, Portugal, Romania, Slovenia, Spain and Switzerland.

Most 2021 samples in monitored areas were sensitive.

Less sensitive isolates were detected at low frequency in commercial vineyards of France (Armagnac) and Italy (Veneto-Friuli and Emilia-Romagna) and in a small number of trial sites in France, Italy (Piemonte) and Spain (Galicia).

The resistance factor associated with the less sensitive isolates from Italy ranged from low to high depending on the OSBPI target site mutation. Molecular characterization of these isolates revealed the presence of target site mutations N837I, G770I, I877F and V820G (based on *P. infestans* homology numbering). Mutation I877F was also reported from a trial site in Spain (Galicia).
In 2020, molecular monitoring conducted in China detected the presence at low frequency of target site mutation N837I in 2 provinces.

In previous years, a few isolates with reduced sensitivity have been found in a small number of trial sites located in Austria, France, Italy, Germany, Portugal and Spain where OSBPI fungicides have been used intensively during several years. The frequency of these isolates was however low. In some of these isolates, target site mutations have been identified at positions 770, 837 and 863 (based on *P. infestans* homology numbering).

Potato/tomato late blight (*Phytophthora infestans*)

Data presented by Bayer, Corteva and Syngenta

In 2021, sensitivity data have been generated for samples originating from potato and tomato crops in Belgium, China, Czech Republic, Denmark, France, Germany, Greece, Hungary, Indonesia, Ireland, Italy, Netherlands, Poland, Portugal, Spain and Sweden.

All 2021 samples in monitored areas of Europe were sensitive. Molecular characterization of samples from Indonesia revealed the presence of mutations N837I and G770V at the OSBPI target site (based on *P. infestans* homology numbering).

In 2019, single isolates with reduced sensitivity were detected in four commercial areas of Indonesia and in the Antioquia region of Colombia.

Cucurbit downy mildew (*Pseudoperonospora cubensis*)

Data presented by Corteva and Syngenta

In 2021, sensitivity data have been generated for samples originating from cucumber, melon and zucchini crops in Bulgaria, China, Croatia, France, Greece, Hungary, Italy, Poland, Spain and Switzerland. All European samples were sensitive.

As in 2019 and 2020, sensitivity monitoring conducted in China showed a broad sensitivity situation, however a small number of populations with higher EC_{50} values were detected in the Shandong and Henan (1) provinces (crops grown under polytunnel). Molecular characterization of these populations revealed the presence of OSBPI target site mutations I877F, G770V and L863W (based on *P. infestans* homology numbering).

Lettuce downy mildew (*Bremia lactucae*)

Data presented by Syngenta

In 2021, sensitivity data have been generated for samples originating from Belgium, Croatia, Germany and Greece. All the samples analyzed were sensitive.

Onion downy mildew (*Peronospora destructor*)

No 2021 data was presented.

In 2020, populations from Bulgaria, Croatia, Italy, Germany, Spain, Greece, Slovenia, Poland, Lithuania, Netherlands and Hungary were analyzed at Syngenta by sequencing of the OSBP gene. None of the target site mutations known to cause reduced sensitivity to OSBPI fungicides in other pathogens were detected

Sunflower downy mildew (*Plasmopara halstedii*)

No data was reported for 2020 and 2021.

In 2019, data was presented by Corteva for samples from France, Hungary, Italy and Romania. All isolates were fully sensitive.

OSBPI – General Use Recommendations

- Fungicide programs must deliver effective disease management. Apply OSBPIs at effective rates and intervals according to manufacturers' recommendations. Effective disease management throughout the season is a critical component to delay the build-up and spread of resistant pathogen populations.

- Apply OSBPIs only preventatively and in mixtures with effective fungicides from different cross-resistance groups.

- The mixture partner should give effective control of the target disease(s) at the rate and interval selected.

- Foliar exposure to OSBPI products should not exceed thirty-three percent (33%) of the total period of protection needed per crop.

The number of foliar applications of OSBPI products within a total disease management program must be limited as follows:

OSBPI – Grapes

- Make no more than two (2) applications per season.

OSBPI – All other crops

- Make no more than four (4) applications or maximum 33% of the total period of protection needed per crop, whichever is more restrictive.

- Where the total number of fungicide applications targeting oomycetes is less than three (3), apply no more than one (1) application of an OSBPI product.

- There should be no more than two (2) foliar applications of any OSBPI product per crop for the control of soil-borne pathogens.

- Applications of OSBPI-containing products are to be made no more than three (3) times in sequence before applying a fungicide with a different mode of action. In areas where the agronomic risk is very high (e.g. continuous potato or cucurbit cropping) and resistance has already been reported, further restrictions to the number of consecutive applications are recommended.

- Applications of OSBPI products can be made in alternation with a fungicide with a different mode of action.

OSBPI – Seed/soil treatments

- No foliar fungicide application of an OSBPI fungicide should be made following a seed/soil treatment* with OSBPI fungicides targeting the same soilborne/seedborne pathogen.

* Directed stem sprays are interpreted as foliar not soil application.

OSBPI – Multiple crops

- In case of non-cucurbit multiple crops, do not make more than six (6) foliar applications of OSBPI product per year on the same acreage or greenhouse, targeting the same pathogen.

- Specifically, in the case of cucurbit crops, do not make more than four (4) applications per year on the same acreage or greenhouse, targeting *P. cubensis*.

OSBPI – Nursery crops

- OSBPI products must not be used in nursery production of transplanted agricultural crops.

Next meeting:

3 April 2023 (Syngenta office in Basel)