



Minutes of the FRAC OSBPI Working Group Meeting

25th February 2026 – 09:00 to 16:00

Participants

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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.

OSBPI Minutes of the 2026 discussions

Review of sensitivity monitoring 2025

Grape downy mildew (*Plasmopara viticola*)

Data presented by Bayer, Corteva and Syngenta

In 2025, sensitivity data have been generated for samples originating from Austria, Brazil, China, Croatia, France, Germany, Hungary, India, Italy, Portugal, Romania, Switzerland, and Spain.

In France, extensive monitoring shows an increase of adapted populations in various grape growing regions. Less sensitive populations were detected in commercial vineyards of Armagnac, Cognac and Languedoc-Roussillon, while only single populations with reduced sensitivity were found in Bordeaux, Alsace, Champagne and Loire regions.

In Italy, the frequency of resistant populations/isolates is moderate to high in Veneto, Emilia Romagna, Piemonte, Trentino, Lombardia and Friuli-Venezia-Giulia.

Low to moderate levels of resistance were found in Austria (Steiermark, Burgenland and Weinviertel), Croatia, Germany (Mosel and Baden), Portugal (Vinho Verde), and Spain (Basque, Galicia).

Data generated in 2025 was also presented for grape downy mildew populations from Brazil, China, India, Hungary and Romania which were all characterized as sensitive.

Molecular characterization of less sensitive isolates collected in 2025 mostly revealed the presence of target site mutations N752I and I792F (homolog to N837I and I877F, based on *P. infestans* homology numbering)

As in previous years, a few samples/isolates carried target site mutations G685I/V, V735G, and L778W (homolog to 770, 820 and 863 positions based on *P. infestans* homology numbering).

Potato/tomato late blight (*Phytophthora infestans*)

Data presented by Bayer, Corteva and Syngenta

In 2025, sensitivity data have been generated for samples originating from potato and tomato crops in Austria, Belgium, Brazil, China, Colombia, Denmark, Finland, France, Germany, Greece, Indonesia, Ireland, India, Italy, Latvia, Lithuania, Netherlands,

Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom, and Vietnam.

All samples collected from tomato crops in Europe were sensitive.

In potato, in 2025, high frequencies of resistance were found in Belgium, Germany, the Netherlands, Colombia (Antioquia, Cundinamarca) and Indonesia. In these countries, reduced efficacy of OSBPI-based products has been observed.

Low to moderate frequency of resistant strains/populations were detected in France, Switzerland, Austria, Vietnam (Lam Dong), Poland, Sweden, Portugal, and the UK.

Single resistant samples were found in Denmark, with no reports of reduced product performance.

All 2025 samples from potato crops in Brazil, China, India, Italy, Ireland, Latvia, Norway, Lithuania, and Spain were fully sensitive.

Molecular studies conducted in 2025 revealed the presence of target site mutations G770V and N837I/F/L. Strains with double mutations N837F + G770V were also reported and are also associated with high resistance factors. Mutation I816M was detected but does not impact sensitivity to OSBPIs.

Genotypes of *Phytophthora infestans* are classified by Euroblight. These genotypes could express variable levels of aggressiveness, but are not linked to fungicide resistance, which is genetically independent. OSBPI resistance has been found in multiple Euroblight genotypes.

Cucurbit downy mildew (*Pseudoperonospora cubensis*)

Data presented by Corteva and Syngenta

In 2025, sensitivity data have been generated for samples originating from China, Korea, USA, Guatemala and Vietnam.

In 2025, molecular studies conducted with samples from China, Korea, Guatemala and Vietnam revealed the homolog of N837I, L863W and I877F mutations in *P. infestans*.

Lettuce downy mildew (*Bremia lactucae*)

No 2025 data was presented.

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*)

Data presented by Corteva and Syngenta.

In 2025, molecular studies were conducted with samples from Belgium, France, Italy, Germany, Greece, the Netherlands, Poland, and Spain.

None of the target site mutations known to cause reduced sensitivity to OSBPI fungicides in other pathogens were detected.

Sunflower downy mildew (*Plasmopara halstedii*)

Data presented by Corteva

In 2025, molecular showed no mutation in samples originating from Bulgaria, Greece, France, Hungary, and Romania.

Citrus Phytophthora root rot (*Phytophthora palmivora* and *P. nicotianae*)

No 2025 data was presented.

In 2020, samples of *Phytophthora palmivora* and *P. nicotianae* from the USA (Florida) were found to be fully sensitive.

Requirements for Mutation-Based Resistance Statements

Only target-site mutations with confirmed impact on OSBPI fungicide sensitivity should be considered for resistance statements. When populations are analyzed instead of individual strains, conclusions on resistance should be based on quantification of the impactful mutations, and not solely on their presence or absence.

Recommendations for 2026

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 consecutive applications of OSBPI fungicides.
- Make no more than two (2) applications per season.
- If the total number of applications targeting downy mildew is 4 or less, apply only one (1) application of OSBPI.

OSBPI – Potato

- Make no consecutive applications of OSBPI fungicides.
- Make no more than three (3) applications per season.
- If the total number of applications targeting late blight is 6-10, make no more than two (2) applications per season.
- If the total number of applications targeting late blight is 5 or less, make only one (1) application per season.
- In countries where OSBPI resistance has developed, 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 two (2) 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 cucurbit cropping) and resistance has already been reported, further restrictions to the number of consecutive applications and alternation are recommended.

OSBPI – Seed/soil treatments

- Where an OSBPI fungicide is used as a seed/soil treatment* then, as a precautionary measure, it should be counted as one of the permitted foliar OSBPI applications per crop.
- The first foliar fungicide applied after an OSBPI seed/soil treatment* must not contain an active substance with the OSBPI MoA and must also provide satisfactory disease control against the fungal pathogen(s) targeted by the OSBPI seed/soil treatment*.
- If needed, continue foliar application with alternating fungicidal MoAs for the remaining growing period.

* 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:

February 24th, 2027 (Corteva site in Eschbach, Germany).