



## **1. Monitoring Results 2018 (FRAC members)**

### **1.1 *Botrytis* results**

#### Vineyards

(BASF, Bayer, K-I Chemical, Syngenta)

Extensive monitoring studies in Europe, Chile, and New Zealand have been carried out for more than a decade by Bayer, K-I Chemical, Syngenta, and BASF.

In 2018, sensitivity data from commercial vineyards and trial sites were presented for France, Germany, Austria, Chile, Croatia, Italy, Greece, Belgium, Portugal, Czech Republic, Spain, and Hungary.

Data from these studies show that frequencies of resistant strains varied in Europe from zero to moderate and in Chile from zero to high especially at trial sites, with regional variability. These results reflect a stable situation and are comparable to the observations made during the last ten years.

Products, applied according to the FRAC-AP guidelines in grape spray programs, maintained good performance in the field.

#### Strawberries

(Syngenta)

Sensitivity monitoring was carried out during 2018 in Austria, Belgium, Croatia, France, Germany, Hungary, Italy, Norway, Poland, Slovenia, and Spain, from commercial locations and trial sites.

The data show that the frequency of resistant isolates is moderate, fluctuating from field to field, and ranging from zero to high. Compared to the last ten years, the frequency of resistant isolates in the monitored populations remained also stable.

First monitoring studies in 2017 with limited number of samples from China indicated besides sensitive isolates also presence of resistant ones.

Products, applied according to the FRAC-AP guidelines in strawberry spray programs, provided good control in commercial situations.

#### Vegetables

(Syngenta)

Sensitivity monitoring in tomato, peas, and beans was carried out during 2016 in the Netherlands, Belgium, Czech Republic, Italy, Serbia, France, and Poland with a limited number of samples obtained from commercial locations and trial sites. Overall, the data show a low frequency of resistant isolates in tomato and beans.

In 2017 and 2018, limited sensitivity data for tomato samples collected in Belgium and the Netherlands showed no to moderate frequency of resistant isolates. Limited monitoring was also carried out in beans: one Spanish sample from 2018 showed resistance, while all samples from France were sensitive.

In 2017, first monitoring studies with limited number of tomato and cucumber samples from China indicated, similar to the situation in strawberries, besides sensitive isolates also presence of resistant ones.

Evidence from field and laboratory trials has shown that there is a medium resistance risk of *Botrytis* to APs. Good agronomic practices and strict adherence to the FRAC AP use guidelines are crucial to ensure that APs remain effective due to the risk of increasing occurrence of multiple resistant strains and multidrug resistant (MDR) strains, particularly in soft fruits.

For more information on these different resistance types see the latest publications on AP related resistance research (Mosbach *et al.*, 2017).

## **1.2. *Venturia* results (BASF)**

First monitoring data for 2018 were presented. Studies are still in progress. Samples from Austria, France, Germany, Italy, Belgium, Hungary, Poland, Portugal, Spain, Turkey, Greece, and the UK were analyzed. Based on dose-response to APs using *in vivo* biotests, populations are classified as either sensitive, moderately adapted or resistant.

In 2016 and 2017, the trend for lower resistance frequencies at commercial and trial site locations, as already observed in 2015, was confirmed. This was linked to the detection of more sensitive and less moderately adapted populations in all apple growing areas monitored.

In 2018, the sensitivity stabilized on a similar level as reported for the past years, indicating that current resistance management strategies are efficient.

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## **2. Use Recommendations**

The purpose of the use guidelines for AP containing products is to maintain the sensitivity in the target pathogens and to prevent crop losses due to resistant pathogen populations.

### **2.1 General AP's Guidelines (all crops)**

Where different AP-containing products are used in one season, the cumulative number of applications with cyprodinil-, pyrimethanil- or mepanipyrim-containing products must not exceed the maxima as mentioned below.

For sound resistance management, good agricultural practices, including phytosanitary measures and crop protection, should be followed not only in commercial practice, but also in nurseries.

The use recommendations were reviewed during the meeting on December 10<sup>th</sup>, 2018. The *Botrytis* and *Venturia* guidelines have not been changed.

## 2.2 *Botrytis* Guidelines

- Where up to three treatments are made per season, the number of applications of AP-containing products is limited to one.
- In situations where four to six *Botrytis* treatments are made per crop and season, a maximum of two applications with AP-containing products are recommended.
- In specific situations where seven or more *Botrytis* treatments are required per crop and season, a maximum of three applications with AP-containing products is recommended and not more than two consecutive applications.
- For specific crops and products, follow use recommendations of individual companies.

## 2.3 *Venturia* Guidelines

- Apply a maximum of four AP-containing products per season.
- In locations where moderately adapted or resistant populations have been reported, use APs only in mixture with an effective non cross-resistant scab fungicide.
- Individual products should always be used at recommended dose rates and during the period when they are most effective.
- Curative use only in conjunction with reliable scab warning systems.

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The next AP FRAC Working Group meeting is scheduled for January, 20<sup>th</sup>, 2020.

## Literature

Mosbach *et al.*, 2017: Anilinopyrimidine Resistance in *Botrytis cinerea* is linked to Mitochondrial Function, *Front. Microbiol.*, <https://doi.org/10.3389/fmicb.2017.02361>