

Importance of Metiram in the control of *Phomopsis viticola* on grapes in Italy

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Technical Management APES

Phomopsis cane (dead arm) is a grapevine disease known in Europe since the early 20th century and widespread in most growing regions where it can reach more or less seriously, almost all varieties. Damages occur in spring by a bad budding at the base of sick branches and a slower growth of diseased shoots, or even absence of budding. In summer, a narrowing of the branches is observed at their base which makes them weak and brittle. The period of contamination is essentially at spring bud break, so an effective control of the disease is obtained by carrying out two treatments at beginning of bud bursting and 2-leaf stage.

In Italy this disease is particularly aggressive on 3 very important wine varieties from an economical point of view which are Sangiovese, Montepulciano d'Abruzzo and Vermentino but also on 3 very important table grapes varieties as Italia, Regina and Cardinal.

Metiram has been registered for the control of *Phomopsis viticola* for many years (POLYRAM, 70% Metiram), and has shown always superior control in comparison to other standards belonging to the EBDC family as Mancozeb or Propineb.

Fungicides are a crucial component of *Phomopsis* control, which in Italy is often controlled by use of multisite products applied for the control of Downy Mildew

Actually, we know that this disease can be aggressive if spring treatments are not carried out. Integrated management for the control of the disease is a must, based in different aspects:

Control of Phomopsis is based on preventative actions with the aim to avoid fast canopy growing and minimizing inoculum by following agronomical practices:

- Remove and burn affected shoots
 - Avoid shoot cutting and buryment of shoots
 - Avoid shoots growing near the ground
 - Avoid sprinkling irrigations
 - Use of certified nursery material
 - Increase air circulation in the grapeyard with adequate green pruning
 - Avoid nitrogen overfertilization
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- **Make full use of fungicides with different modes of action:** avoid over-reliance on a single fungicide group, use co-formulations or tank mixes of different active ingredients, target specific products to appropriate growth stages and **include multi-site fungicides e.g. Metiram, Mancozeb...**

All these practices are important to control the disease but adequate fungicides use (product, spray interval, time of application...) is key in Phomopsis control. In Italy there are many products available but multisite active ingredients are an especially important segment.

In 2018 FRAC international (Fungicide Resistance Action Committee) published a document about the **high Importance of multisite fungicides in managing pathogen resistance**. The Use of multisite fungicides (see FRAC Group M) in spray programs in crops with multiple sprays such as grapes, fruits, vegetables or potatoes is really important. Due to their mode of action, multisite fungicides are considered as a low resistance risk group. **Therefore, they offer the possibility for use as mixing partners or alternating with single site and other medium to high resistance risk fungicides.** Over the past decades, no cases of field resistance against multisites have been reported. (FRAC, 2018)

There are clear benefits to recommending multi-site fungicides in spray programs:

- **Multisite fungicides display a low risk to develop resistance and are effective mixing/alternating partners for medium to high risk fungicides.**
- **Beyond protecting and prolonging the lifespan of highly effective medium to high resistance risk fungicides**, multisite fungicides provide added levels and spectrum of disease control. With this they can also support the single sites to be even more efficient.
- **Multisite fungicides are considered a valuable tool to manage resistance** by preventing or delaying its development to many pathogens in many crops.

Restricting the use of multisite fungicides from use in important crops could result in faster development of resistance to single site mode of action fungicides. This in turn could lead to epidemic disease development, serious crop losses, and finally the loss of highly effective fungicides for a sustainable disease management.

Multi-site fungicides such as Metiram remain important in solo products and also effective mixture partners in anti-resistance strategies.

Situation in Italy about fungicides registered for *Phomopsis* control in grape.

Even if *Phomopsis* cannot be considered a major disease in Italy, in some areas it is recorded as an increasing problem. To avoid damages, in many areas is a common practice to apply contact fungicides, mainly dithiocarbamates, specifically applied for *Phomopsis* control in a very early stage (BBCH 08 – 11: Bud burst: green shoot tips clearly visible - First leaf unfolded and spread away from shoot).

There are few active ingredients effective against this disease:

→ [REDACTED]: Good efficacy expected. Not included in the regional positive lists for IPM for *Phomopsis*. Strategic active ingredient for downy mildew control and anti-resistance strategy, later in the season. Only available in mix with Potassium Phosphonate, which is not recommended to be applied at *Phomopsis* timing.

→ [REDACTED]: Good efficacy expected. Not included in the regional positive lists for IPM for *Phomopsis*. Strategic active ingredient for downy mildew control and anti-resistance strategy, later in the season.

→ [REDACTED]: Inorganic fungicide with medium – low efficacy. Not included in the regional positive lists for IPM for *Phomopsis*. Many compounds do not have the registration for *Phomopsis*. The limitation in the rate/year/ha will reduce the use. Not included in the regional positive lists for IPM for *Phomopsis*.

→ [REDACTED]: Part of the dithiocarbamates. Has still good efficacy. Is under strong regulatory pressure.

→ [REDACTED]: Also part of the dithiocarbamates. Has in general good efficacy. Also is under regulatory pressure.

It is important to underline that the typical timing for *Phomopsis* applications does not fit downy mildew control, therefore – considering the limited number of applications allowed per year – in most of the cases multisite active ingredients very effective on downy mildew (dithianon, folpet) need to be applied later in the season for a robust downy mildew control strategy. **The only active ingredient recommended by the regional positive lists for Integrated Pest Management for *Phomopsis* are mancozeb and metiram** (plus Pyraclostrobin, but only applied in ready mix with metiram).

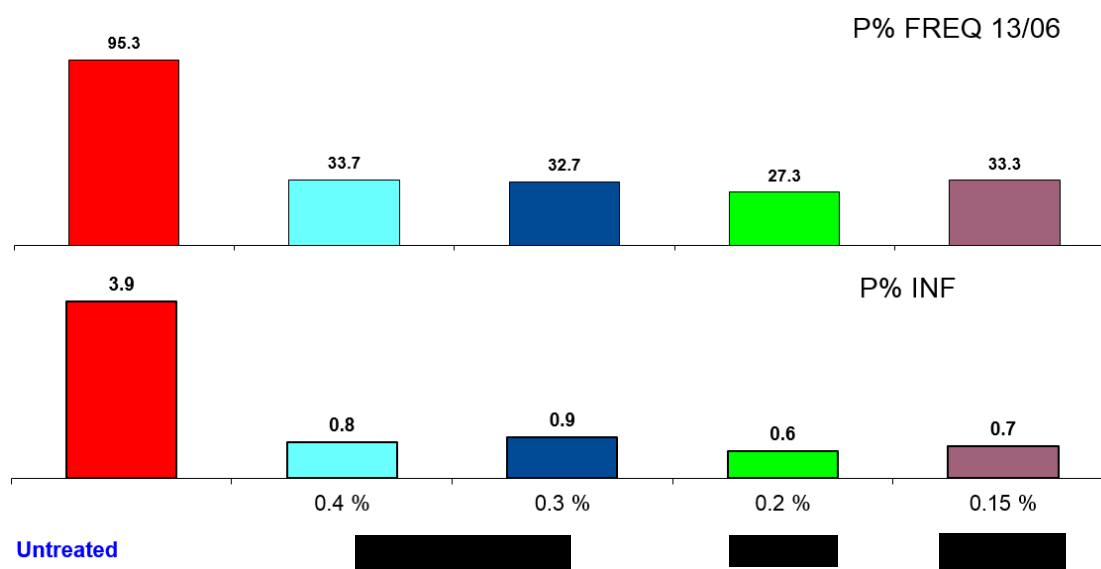
For the reasons above, in the current scenario, metiram is strategic active ingredient for *Phomopsis* control.

Metiram is demonstrated to have a good efficacy on ***Phomopsis***. As example, here below is reported the results of two trials carried out in Italy, reported in the following graphs.

The efficacy of the fungicides was assessed checking the pest frequency (P% FREQ) and pest severity (P% INF) on the shoots one month after the application at typical *Phomopsis* timing.

In graph 1 is reported the result of a trial carried out in Piedmont on Pinot noir. In this trial, 2 different rates of metiram were compared to mancozeb and Cabrio Top (metiram + pyraclostrobin). The assessment here reported was made on the first internode, and metiram demonstrated a good efficacy (comparable to mancozeb).

Graph 1 - Efficacy against *Phomopsis* (trial [REDACTED]). Assessment on First internode, June the 13th 2012



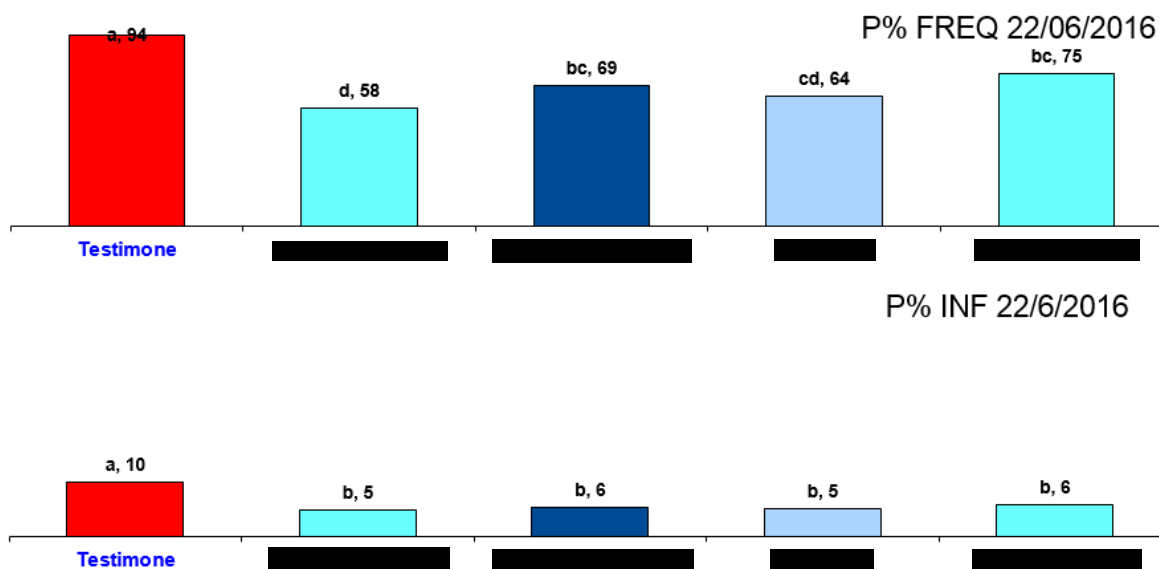
Cultivar: Pinot noir

Location: Chieri (TO)

Application dates: 17/4/12 24/4/12 2/5/12

In graph 2 is reported the result of a trial carried out on table grape, cultivar Red Globe, in Puglia.

Graph 2 - Efficacy against *Phomopsis* (trial [REDACTED]).
Assessment on Third internode, June the 22nd 2016



Cultivar: Red Globe (table grape)

Location: Acquaviva delle fonti (BA)

Application dates: 7/4/2016 – 18/7/2016

SNK-Test, no transformation, $p < 0,05$

In this trial, metiram (commercial name: Polyram) at full label rate was compared to to [REDACTED]. In this situation of very high disease pressure, all the treatments reduced significantly *Phomopsis* incidence in comparison to untreated. Polyram was tendentially the best treatment of the trial.



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Fig. 1 – shoot taken from the untreat plot of trial [REDACTED]



Summary & Conclusions

Even if it is considered a low resistance risk pathogen by FRAC, and a secondary disease, Phomopsis cane, if not well controlled, could represent a risk for grape growers affecting more than one productive cycle.

Period of application of products for Phomopsis does not coincide with downy mildew and powdery mildew normal applications, this anticipated appearance if not appropriately followed and controlled could create the basis for more serious issues later on in the season.

Excluding 'multisite' products, very few actives are available for the farmers and normally registered for later applications.

Considering instead 'multisite' products we still have few families as [REDACTED] these last being the only ones providing reliable level of control, clearly higher than the others.

In these conditions Metiram represents one of the few multisite fungicides registered in Italy for use against *Phomopsis viticola* on grapes. The active is considered a very important tool for the Italian farmers to control in a sustainable way dead arm and to maintain in healthy state their vineyards granting quality and profitability.

Bibliography

EGGER. 2012. Accrescere l'attenzione per i parassiti «minori» della vite . L'Informatore Agrario • 12/2012 pg 46 – 50

FRAC. 2018. Importance of multisite fungicides in managing pathogen resistance. Available in FRAC website

Field report trial [REDACTED] (attached in this document)

Field report trial [REDACTED] (attached in this document)