



**24-28 October**



**Book of Abstracts**

**Résumés des communications**

**Résúmenes de comunicaciones**

**Riassunti delle comunicazioni**

**Zusammenfassungen der Beiträge**



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14<sup>th</sup> General Assembly of the OIV  
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**"Vitiviniculture: Technological advances to market challenges"**

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# **ORAL & SHORT COMMUNICATIONS**

ritrovato in metà delle viti provenienti da tutti i Paesi considerati. Sebbene la dimensione del campionamento sia limitata, i risultati mostrano per la prima volta la presenza del GPGV in Romania, Ucraina, Bosnia, Montenegro, Serbia, Croazia, Macedonia, Portogallo e Spagna, sottolineando come il virus sia ampiamente presente in Europa. I nostri risultati sembrano suggerire che il GPGV fosse limitato ad alcuni paesi dell'Europa orientale prima del 2005, e che si sia largamente diffuso in Europa dopo il 2010.

### **EVOLUTION DE LA NOUVELLE MALADIE DU PINOT GRIS ET DU GRAPEVINE PINOT GRIS VIRUS (GPGV)**

Une nouvelle maladie de la vigne, caractérisée par un retard de l'ébourgeonnement, par des mosaïques et par des déformations foliaires, a été identifiée pour la première fois sur le Pinot gris en Italie du Nord en 2013. Par la suite, la maladie été observée sur d'autres variétés dans d'autres régions d'Italie et pays européens tels que la Slovénie. La maladie été associée à la présence du Grapevine Pinot gris virus (GPGV), un trichovirus récemment isolé.

Dans ce travail, on a étudié la présence de la maladie du Pinot gris et du virus surtout en Vénétie, une région de l'Italie du Nord-Est. Au cours de la période printemps-été 2014, un nombre de 290 vignobles environ, cultivés principalement avec les variétés Glera et Pinot gris, a été contrôlé. La maladie était présente dans de nombreux vignobles des principales zones viticoles, mais avec une incidence des plantes symptomatiques généralement basse. Une incidence des plantes symptomatiques supérieure à 10% a été observée dans quelques cas seulement mais toutefois emblématiques. Pour 8 vignobles, choisis parmi ceux qui présentaient une plus grande incidence de la maladie, le monitoring des symptômes été effectué aussi pour les deux années successives. Pendant les trois années d'observation, on a relevé une augmentation progressive et une intensification annuelle allant jusqu'à 80 % du nombre des plantes symptomatiques, alors que l'intensité des symptômes a été plus forte dans les années caractérisées par une pluviosité élevée au début de la saison végétative (2014 et 2016).

En parallèle, une étude moléculaire sur la présence de GPGV dans des échantillons recueillis en Vénétie dans différentes périodes nous a permis de déterminer que ce virus n'était pas présent dans les échantillons recueillis il y a environ 10 ans et conservés à -80°C dans la collection du CREA-VIT sous la forme d'extraits de ARN, mais il était très présent dans les échantillons recueillis en Vénétie en 2013-2014. Ces résultats font supposer que le GPGV n'est apparu que récemment en Vénétie et s'est diffusé rapidement.

Afin d'obtenir des informations sur l'origine et la diffusion du virus en Europe, une recherche a été conduite dans une riche collection d'échantillons de plantes de vigne qui proviennent de différents pays européens et qui sont conservés auprès du CREA-VIT depuis une quinzaine d'années. Les analyses des échantillons recueillis avant 2005 ont montré la présence du GPGV dans presque toutes les plantes provenant de la République Tchèque et de l'Ukraine, et dans presque la moitié des échantillons provenant de la Macédoine et du Monténégro. Les autres échantillons provenant de la Croatie, de la France, de la Grèce, du Portugal et de la Serbie étaient négatifs. Au contraire, dans les échantillons recueillis après 2010, le virus été déterminé dans la moitié environ des plantes provenant de l'ensemble des pays considérés. Même si la dimension de l'échantillonnage était limitée, les résultats montrent pour la première fois la présence du virus en Roumanie, en Ukraine, en Bosnie, dans le Monténégro, en Serbie, en Croatie, en Macédoine, au Portugal et en Espagne, mettant ainsi en évidence que le GPGV est largement présent in Europe. Nos résultats semblent suggérer que le GPGV était circonscrit à certains pays de l'Europe de l'Est avant 2005, et qu'il s'est amplement répandu en Europe après 2010.

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### **2016-1201 LOW-IMPACT CONTROL OF FUNGAL DISEASES OF THE GRAPEVINE**

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Environmental sustainability, linked to fungicide treatments, leads to a quest for innovative answers, which are closer to the environmental ones. In this context we included our experimental activity, developed in the harvests of 2013, 2014 and 2015, which is looking for innovative defense solutions in viticulture.

The work was based on the study of a new low-impact product, which contains peroxides, for the defense against fungi pathogens in grapevine, especially downy mildew (*Plasmopara viticola*) and powdery mildew (*Oidium tuckeri*).

Some tests were done at the experimental farm at the University of Udine "A. Servadei", while others were carried out in vineyard in some farms of Northern Italy.

The effects of the concentration of the product in various stages of development of the fungi were tested and chlorophylls and reactive oxygen species in leaves were analyzed.

We verified the levels of infection, the phenological parameters of the vine, the grape quality and wine quality after microvinification. Regarding fungal infections, we observed different responses depending on cultivars and growing zones; the result of exclusive treatment with peroxides on the variety Glera (Prosecco), without fungal infections, nor any problems on vegetation or on wines, were very significant during the harvest in 2015.



Analyzing the theses, the main macro compositional parameters are not significantly different. Focusing on the polyphenolic aspect, we revealed an important amount especially in the thesis not treated. This fact can be linked to the plant response in order to act a protection mechanism against fungi parasites. Focusing on peroxides residues, we observed different results in different cultivars, however peroxide incremented values did not affect the winemaking processes.

Among the possible problems, we have to note the early senescence showed in Refosco and Chardonnay, while the tests on Ortrugo and Glera cultivars did not present this problem. In general, the preliminary results confirmed the possibility of total protection against fungal diseases in vineyards with the new product at low impact for some varieties under certain climatic conditions; however, we should consider the possibility of managing certain situations with an integrated strategy. The opportunity of using the new peroxide-based product offers new perspectives for the management of viticulture. The treatments should be applied in a rational way, taking into account weather conditions and the physiological responses of the cultivars. According to the results, further trials are needed to respond to situations of risk by optimizing the treatment conditions in each specific condition.

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### **CONTROLE A FAIBLE IMPACT DES MALADIES FONGIQUES DE LA VIGNE**

La durabilité des traitements en vigne est un facteur commun qui oriente la recherche vers des solutions innovantes et plus respectueuses de l'environnement. Dans ce contexte nous avons réalisé une activité expérimentale en 2013, 2014 et 2015 dans le but de trouver des solutions innovantes pour la défense en viticulture.

Le travail a été réalisé pour tester un nouveau produit à faible impact environnemental, à base de peroxydes, pour prévenir et contrôler les parasites fongiques de la vigne, en particulier le mildiou et l'oïdium.

Les tests en vigne ont été effectués dans la domaine expérimentale Servadei de l'Université de Udine et dans d'autres domaines du Nord Est de l'Italie. Les effets des concentrations du produit à différents stades de développement des parasites ont été vérifiés, enfin ont été analysés les chlorophylles et les espèces réactives de l'oxygène dans les feuilles. Les autres paramètres analysés sont le niveau de pression des maladies, des observations phénologiques, le contrôle de la qualité du raisin et la qualité du vin après micro-vinification. En ce qui concerne les infections fongiques, nous avons observés réponses différentes liées aux cultivars et aux zones viticoles; très significatif dans la vendange 2015 le résultat du traitement exclusif avec les peroxydes sur la variété Glera (Prosecco) sans aucun problème de infections fongiques, sans problèmes sur la végétation et sans problème sur les vins élaborés. En général les principaux paramètres qualitatifs des raisins ne sont pas significativement différents entre les thèses. Si on analyse les données des polyphénols, il y a une tendance générale à une plus grande accumulation dans les thèses non traitées. En ce qui concerne les résidus de peroxydes, on observe des résultats différents en fonction de la variété. Dans tous les cas, les valeurs plus importantes des peroxydes n'ont pas influencé l'élaboration des vins. Parmi les questions soulevées il faut noter des phénomènes de sénescence précoce sur Chardonnay et Refosco. Par contre dans les cépages blancs Ortrugo et Glera (Prosecco) ce phénomène n'a pas eu lieu. Les résultats de production ont confirmé la possibilité de conduire intégralement la protection contre les parasites fongiques en vigne avec le nouveau produit à faible impact pour certaines variétés, dans certaines conditions climatiques, cependant il faudra considérer la possibilité de gérer certaines situations avec une stratégie de défense intégrée. La possibilité d'utilisation du nouveau produit à base de peroxydes offre des nouvelles perspectives pour la gestion de la viticulture, les traitements devront être conduits de manière raisonnée en considérant les conditions climatiques et les réponses physiologiques de la plante. D'après les résultats obtenus, des approfondissements sont nécessaires pour répondre aux situations de risque en optimisant les conditions du traitement dans chaque condition spécifique.

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### **CONTROLLO A BASSO IMPATTO DEI PARASSITI FUNGINI DELLA VITE**

La sostenibilità ambientale dei trattamenti antiparassitari è un filo conduttore che indirizza la ricerca verso soluzioni innovative e sempre più rispettose dell'ambiente. In questo ambito si inserisce l'attività sperimentale che è stata realizzata nelle vendemmie 2013, 2014 e 2015 per individuare soluzioni innovative per la difesa in viticoltura.

Il lavoro ha previsto lo studio di un nuovo prodotto a basso impatto ambientale, a base di perossidi, per la difesa nei confronti dei parassiti fungini della vite, in particolare Peronospora e Oidio.

Le prove sono state eseguite presso l'azienda sperimentale A. Servadei dell'Università di Udine, mentre altre esperienze sono state realizzate in pieno campo su alcune aziende del Nord-Italia.

Sono stati studiati gli effetti della concentrazione del prodotto nelle diverse fasi di sviluppo dei funghi. Sono stati inoltre verificati il livello delle infezioni fungine, i rilievi fenologici, il controllo di qualità dell'uva, inoltre sono state effettuate le micro-vinificazioni delle parcelle sperimentali.

Per quanto riguarda le infezioni fungine sono state osservate diverse risposte in funzione della cultivar e della zona viticola. Molto significativi sono stati i risultati della vendemmia 2015 su Glera (Prosecco) dove è stata effettuata una difesa esclusivamente con il nuovo prodotto; in questo caso non si sono osservate infezioni fungine, la vegetazione è risultata perfetta e non si sono avuti problemi in vinificazione.

I principali parametri macro-compositivi delle uve e dei vini non hanno evidenziato differenze significative tra le tesi.

Passando ad analizzare il quadro polifenolico generale delle diverse esperienze, si osserva una tendenza ad un maggiore accumulo di polifenoli nelle tesi non trattate. Questo fatto potrebbe essere legato ad una risposta della pianta come meccanismo di difesa nei confronti dei parassiti fungini.

In riferimento ai residui di perossidi sono stati osservati risultati diversi in funzione delle varietà, in ogni caso i valori incrementati dei perossidi non hanno determinato problemi in fase di vinificazione.

Tra i problemi emersi va citato il fenomeno della senescenza anticipata che ha interessato Refosco e Chardonnay. Nel caso invece delle cultivar a bacca bianca Ortrugo e Glera tale fenomeno non si è verificato.

I risultati ottenuti in queste esperienze hanno confermato la possibilità di condurre integralmente la protezione contro alcuni parassiti fungini con il nuovo prodotto a basso impatto a base di perossidi in certe varietà, tuttavia vanno considerate le condizioni climatiche e le cultivar e non va esclusa la possibilità di gestire situazioni a rischio, mediante una strategia di difesa integrata. La possibilità di utilizzo del nuovo prodotto a base di perossidi offre nuove prospettive di difesa in viticoltura, tuttavia i trattamenti dovranno essere gestiti in modo ragionato considerando le condizioni climatiche e le risposte fisiologiche della pianta.

Anche se i risultati sono incoraggianti, sono necessari approfondimenti per rispondere alle criticità osservate ottimizzando le condizioni di trattamento per ogni specifico caso.

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#### **2016-1133 GRAPE BERRY BACTERIAL INHIBITION BY DIFFERENT COPPER FUNGICIDES**

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Copper fungicides are widely used in viticulture. Due to its large spectrum of action, copper provides an efficient control over a great number of vine pathogens.

The use of copper-based fungicides is a shared practice in both organic and conventional farming systems. In addition to its action against downy mildew, copper-based fungicides are very effective in curative treatment of bacterial necrosis. Furthermore, copper does not present problems in terms of pathogen resistance.

Our previous research showed that, independently of the farming system, high levels of cupric residues can impact grape-berry microbiota, in terms of the size and population structure, reducing the diversity and the abundance (Martins et al. 2012 and 2013).

In order to determine the inhibitor role of copper over grape berry bacterial microbiota, we determined Minimum Inhibitory Concentration (MIC) of different copper formulations for bacterial species isolated from grape berries: copper sulphate (CuSO<sub>4</sub>) pure (i.e. without any excipient, or together with calcium hydroxide such as the Bordeaux mixture (CuSO<sub>4</sub> + Ca(OH)<sub>2</sub>), copper oxide (Cu<sub>2</sub>O), copper hydroxide (Cu(OH)<sub>2</sub>). For this study we have used a collection of 92 bacterial strains isolated from grape berries in different stages of the ripening process. The results of MIC measurements revealed that the different copper formulations have a variable inhibitory effect.

Concerning the copper sulphate without any excipient, the MIC was 1 mg/mL for 21 %, 2 mg/mL for 71% and 4 mg/mL for 8 % of the bacteria tested. Only one isolate showed a MIC of 8 mg/mL. Regarding the Bordeaux mixture, the MIC varied between 4 and 8 mg/L for 96 % of the isolates. Only one isolate showed a MIC higher than 16 mg/mL. Copper hydroxide is the formulation with the highest inhibitory activity; it prevents visible growth of 48 % of the individuals with concentrations equal to or less than 16 mg/mL. In contrast, copper oxide was the formulation which showed the highest values of MIC, 80 % of the isolates grow with concentrations higher than 32 mg/mL.

Among the different isolates, the species *Pantoea agglomerans*, *Enterobacter cowani*, *Micrococcus endophyticus* and *Pseudomonas graminis* are the most resistant to all copper formulations. The species *Pseudomonas congelans*, *Frigoribacterium faeni* and *Pseudomonas cannabina* were found to be most sensible (i.e. lower MIC).

The inhibitory activity of copper over microbial growth depends on its ionic state (Zevenhuizen et al. 1979). It is the cuprous ions (Cu<sup>2+</sup>) that induce an inhibition of growth in bacteria. The efficiency of the copper-based fungicides will depend on the quantity of ionic copper that can be released.

These results confirm that usage of cupric phytosanitary products should be reasonable independently of the farming system; they also provide evidence of the importance of the choice of which copper formulations are to be used regarding their impact on the grape berry bacterial microbiota.

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