XXII Convegno Nazionale Società Italiana di Patologia Vegetale (SIPaV)

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Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

Dipartimento di Biologia Ambientale
Sapienza Università di Roma

XXII Convegno Nazionale Società Italiana di Patologia Vegetale (SIPaV)

La patologia vegetale tra produttività e sostenibilità

BOOK OF ABSTRACTS

Edited by: Taglienti A., Tomassoli L., Infantino A.

Roma, 19-20-21-22 Settembre 2016

Aula Magna "Antonio Quacquarelli"
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Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria
Centro di ricerca per la patologia vegetale

Società Italiana di Patologia Vegetale

Dipartimento di Biologia Ambientale
Sapienza Università di Roma

XXII CONVEGNO NAZIONALE
SOCIETÀ ITALIANA DI PATOLOGIA VEGETALE

"La patologia vegetale tra produttività e sostenibilità"

Roma, 19 - 22 settembre 2016

Sede: CREA - Centro di Ricerca per la Patologia Vegetale Roma
Aula Magna "Antonio Quacquarelli".

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La patologia vegetale tra produttività e sostenibilità

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XXII Convegno Nazionale
Società Italiana di Patologia Vegetale
La patologia vegetale tra produttività e sostenibilità
Roma, 19-22 settembre 2016

PROGRAMMA

Lunedì 19 settembre 2016

12.00 - 14.30 Registrazione dei partecipanti e affissione dei Posters

14.30 - 15.00 Apertura lavori e saluti delle Autorità

Prima Sessione - **'Omics' and plant-microrganism interaction**

15.00 - 15.30 *Relazione su invito:* CRISPR/CAS9 GENOME EDITING TECHNOLOGY IS A PLANT BREEDING DREAM COMES TRUE. A. Gal-On (Volcani Center, Israel)

Moderatori: ***V. Catara, A. Polverari***

15.30 - 15.42 PLANTS SYNTHESIZE THE PRIMING MOLECULE β-AMINOBUTYRIC ACID (BABA) IN RESPONSE TO STRESS. I. Baccelli, D. Thevenet, A. Balmer, V. Pastor , A. Vallat, R. Neier, G. Glauser and B. Mauch-Mani

15.42 - 15.54 IDENTIFICATION OF VOLATILE ORGANIC COMPOUNDS EMITTED BY DIFFERENT GRAPEVINE GENOTYPES IN RESPONSE TO DOWNY MILDEW INFECTION. V. Lazazzara, C. Bueschl, A. Parich, I. Pertot, R. Schuhmacher and M. Perazzolli

15.54 - 16.06 GENE RESPONSES OF GRAPEVINE AND *BOTRYTIS CINEREA* DURING THE LATENT INFECTION OF BERRIES ("NOBLE ROT"). A. Lovato, T. Colombo, S. Negri, F. Guzzo, G. B. Tornielli and A. Polverari

16.06 - 16.18 INSIGHTS ON THE INTERACTIONS AMONG NON-NATIVE AND NATIVE HETEROBASIDION SPECIES AND THE ECTOMYCORRHIZAL SYMBIONT TUBER BORCHII ON *PINUS PINEA*. L. Giordano, E. Zampieri, G. Lione, A. Vizzini, F. Sillo, R. Balestrini and P. Gonthier

16.18 - 16.48 *Coffee break*

16.48 - 17.00 GENOME-WIDE MICROARRAY ANALYSIS OF TOMATO PLANT IN THREE-WAY INTERACTION WITH *TRICHODERMA HARZIANUM* OR ITS METABOLITE HARZIANIC ACID AND *RHIZOCTONIA SOLANI*. A. Sacco, G. Manganiello, F. Vinale, M.R. Ercolano, R. Marra, N. Lombardi, G. d'Errico, M. Lorito, S.L. Woo

17.00 - 17.12 RNA-SEQ BASED TRANSCRIPTOME ANALYSIS OF *PSEUDOMONAS CORRUGATA* LUXR REGULATORS PCOR AND RFIA. G. Licciardello, A. Caruso, P. Bella, R. Gheleri, C. P. Strano, E. A. Trantas, P. F. Sarris, N. F. Almeida and V. Catara

17.12 - 17.24 RNA-SEQ BASED TRANSCRIPTOME ANALYSIS OF DIFFUSIBLE SIGNALING FACTOR REGULATED TRAITS OF *XYLELLA FASTIDIOSA* SUBSP. *FASTIDIOSA*. C. P. Strano and S. E. Lindow

17.24 - 17.36 TRANSCRIPTOME ANALYSIS OF TWO OLIVE CULTIVARS IN RESPONSE TO *XYLELLA FASTIDIOSA* INFECTION. A. Giampetruzzi, M. Morelli, M. Saponari, G. Loconsole, M. Chiumenti, D. Boscia, V. N. Savino, G. P. Martelli and P. Saldarelli

17.36 - 17.48 *POTATO SPINDLE TUBER VIROID* UPREGULATES DNA METHYLATION-RELATED GENES AND ANTAGONIZES THE INFECTIVITY AND THE ACCUMULATION OF A GEMINIVIRUS. E. M. Torchetti, M. Pegoraro, B. Navarro, M. Catoni, E. Noris and F. Di Serio

17.48 - 18.00 DISTINCT EFFECTS OF TOMBUSVIRAL P19 RNA SILENCING SUPPRESSOR ON SMALL RNA MEDIATED PATHWAYS IN PLANTS. L. Kontra, T. Csorba, M. Tavazza, A. Lucioli, R. Tavazza, S. Moxon, V. Tisza and J. Burgyán

18:00 - 18:12 IDENTIFICATION AND CHARACTERISATION OF THE GRAPEVINE ATL GENE FAMILY AND FUNCTIONAL ROLE OF AN *ATL* GENE FROM *VITIS RIPARIA* IN DOWNY MILDEW RESISTANCE. P. Ariani, A. Regaiolo, A. Lovato, A. Giorgetti, A. Porceddu, S. Camiolo, D. Wong, S. Castellarin, C. Zadra, E. Vandelle and A. Polverari

18.12 - 18.24 MILD AND SEVERE *'CANDIDATUS PHYTOPLASMA ASTERIS'* STRAINS INDUCE DIFFERENT miRNA EXPRESSION PROFILES IN INFECTED PERIWINKLES. M. Morano, A. Carra, L. Galetto and S. Palmano

18.30 - 19.00 **Premio Scaramuzzi**

19.00 - 20.00. *"Apericena" di Benvenuto*

Sessione serale *Opificio delle Idee*

Prima Sessione - Moderatori: ***S. Pangallo, F. Bove***

20.00 - 20.10 PHYTOPLASMA-HOST INTERACTIONS: A CLOSER LOOK THROUGH LASER MICRODISSECTION AND IN SITU HYBRIDIZATION. M. Pesando, R. Balestrini, D. Bosco, C. Marzachì and L. Galetto

20.10 - 20.20 HETEROLOGOUS RNA-RNA INTERACTIONS INVOLVED IN THE PRESERVATION OF *BEET NECROTIC YELLOW VEIN VIRUS* GENOME INTEGRITY. M. Dall'Ara, C. Ratti, E. Klein, S. E. Bouzoubaa and D. Gilmer

20.20 - 20.30 ROLE OF *XYLA* GENE ON THE VIRULENCE OF THE FUSARIUM HEAD BLIGHT PATHOGEN *FUSARIUM GRAMINEARUM*. F. Tini, A. H. Benfield, L. Covarelli and D. M. Gardiner

20.30 - 20.40 STEM-TO-HEAD COLONIZATION BY THREE FUSARIUM SPECIES AND DEOXYNIVALENOL TRASLOCATION IN BARLEY (*HORDEUM VULGARE* L.). F. Pecoraro, M. Giannini, G. Beccari, L. Covarelli, A. Pisi, P. Nipoti and A. Prodi

20.40 - 20.50 CAREFUL WITH THAT *AXE* GENE. GENOME PERTURBATION AFTER A PEG-MEDIATED PROTOPLASTS TRANSFORMATION IN *FUSARIUM VERTICILLIOIDES* V. Scala, A. Grottoli, R. Aiese Cigliano, M. Beccaccioli, C. Fanelli, C. Dall'Asta, P. Battilani, M. Reverberi and W. Sanseverino

20.50 - 21.00 FATTY ACID METABOLISM IN THE FUNGAL MAIZE PATHOGEN *FUSARIUM VERTICILLIOIDES*. M. Beccaccioli, A. Grottoli, D. Magali, C. Fanelli, M. Reverberi, M. Ludovici, V. Scala

Seconda Sessione - Moderatori: ***M. Beccaccioli, M. Pesando***

21.00 - 21.10 PGE: A NATURAL ANTIFUNGAL PREPARATION FROM POMEGRANATE PEEL WITH A WIDE SPECTRUM OF ACTIVITY. S. Pangallo, M. G. Li Destri Nicosia, F. V. Romeo, G. E. Agosteo, S. Scibetta, P. Rapisarda, S. O. Cacciola, S. Droby and L. Schena

21.10 - 21.20 RESISTANCE COMPONENTS TO *PLASMOPARA VITICOLA* IN GRAPEVINE GENOTYPES. F. Bove, T. Caffi, E. Gonzalez-Dominguez and V. Rossi

21.20 - 21.30 COMPARING CHESTNUT CULTIVARS AND THE WILD-TYPE FOR THEIR SUSCEPTIBILITY TO THE NUT ROT CAUSED BY *GNOMONIOPSIS CASTANEAE*. G. Lione, L. Giordano, G. L. Beccaro and P. Gonthier

21.30 - 21.40 COMPETITION ASSAYS REVEAL A NOVEL PUTATIVE BIOCONTROL AGENT: *PAENIBACILLUS PASADANENSIS* STRAIN R16 A. Passera, P. Casati, G. Venturini, F. Penaca, F. Quaglino and P. A. Bianco

21.40 - 21.50 SYNERGISTIC EFFECT OF TRICHODERMA AND CHITOSAN APPLICATION IN TOMATO FOR THE CONTROL OF *CUCUMBER MOSAIC VIRUS* INFECTION. N. Rendina, A. Sofo, A. Vitti, A. Scopa and M. Nuzzaci.

Martedi 20 settembre 2016

Seconda Sessione - ***Xylella fastidiosa***

9.00 - 9.30 *Relazione su invito*: DISEASE OUTBREAKS CAUSED BY *XYLELLA FASTIDIOSA* IN EUROPE ARE DUE TO MULTIPLE INTRODUCTIONS. C. Manceau (ANSES, France)

Moderatori: ***M. Barba, P. Saldarelli***

9.30 - 9.42 THE EU RESEARCH PROGRAMS IN RESPONSE TO THE *XYLELLA FASTIDIOSA* EMERGENCY. D. Boscia and M. Saponari

9.42 - 9.54 POTENTIAL DISTRIBUTION OF *XYLELLA FASTIDIOSA* AND ITS INSECT VECTOR *PHILAENUS SPUMARIUS* IN THE MEDITERRANEAN BASIN. L. Bosso, M. Di Febbraro, G. Cristinzio, A. Zoina and D. Russo

9.54 - 10.06 TEST PERFORMANCE STUDY FOR VALIDATION OF DETECTION METHODS OF *XYLELLA FASTIDIOSA*. S. Loreti, N. Pucci, M. Saponari, G. Loconsole, F. Gaffuri, V. Modesti, S. Lucchesi and O. Potere

10.06 - 10.18 DETECTION OF *XYLELLA FASTIDIOSA*: VALIDATION AND IMPLEMENTATION OF ROUTINE TESTING METHODS. G. Loconsole, D. Boscia, O. Potere, S. Zicca, G. Altamura, F. Palmisano, V. N. Savino and M. Saponari

10.18 - 10.30 MONITORING OF *XYLELLA FASTIDIOSA* IN AN ITALIAN PEST-FREE AREA (LATIUM REGION). V. Modesti, N. Pucci, S. Lucchesi, L. Campus and S. Loreti

10.30 - 11.00 *Coffee break*

11.00 - 11.12 A GENOME-WIDE APPROACH TO REDEFINE *XYLELLA FASTIDIOSA* TAXONOMY. S. Marcelletti and M. Scortichini

11.12 - 11.24 A METAGENOMIC INVESTIGATION OF THE MICROBIOME OF *XYLELLA FASTIDIOSA*-INFECTED OLIVES. A. Giampetruzzi, M. Saponari, G. D'Attoma, M. Morelli, M. Chiumenti, D. Boscia and P. Saldarelli

11.24 - 11.36 RAPID SCREENING TESTS FOR DIFFERENTIATING *XYLELLA FASTIDIOSA* ISOLATES. M. Saponari, M. Montes-Borrego, G. D'Attoma, L. De La Fuente, G. Loconsole and B. B. Landa

11.36 - 11.48 TRANSMISSION OF *XYLELLA FASTIDIOSA* TO DIFFERENT HOST PLANTS BY NATURALLY INFECTED *PHILAENUS SPUMARIUS*. V. Cavalieri, D. Cornara, C. Dongiovanni, G. Altamura, D. Boscia, F. Porcelli, D. Bosco and M. Saponari

11.48 - 12.00 ESTABLISHMENT OF AN EXPERIMENTAL FIELD TO EXPLORE THE DIFFERENTIAL OLIVE CULTIVAR RESPONSE TO *XYLELLA FASTIDIOSA* INFECTION. M. Saponari, F. Palmisano, C. Dongiovanni, V. Cavalieri, G. Altamura, G. D'Attoma, G. Loconsole, M. Morelli, A. Saponari, D. Tavano, S. Zicca and D. Boscia

12.00 - 13.00 *Sessione poster (numeri dispari)* 3 Collebrichum

13.00 - 14.30. *Pranzo di lavoro*

Tarza Sessione **I - Plant diseases, pathogen characterization and epidemiology**

14.30 - 15.00 *Relazione su invito*: INTEGRATED MANAGEMENT OF DISEASES TO RECLAIM GRAIN LEGUME IN MEDITERRANEAN REGION. D. Rubiales Olmedo (IAS-CSIC, Spain)

Moderatori: ***L. Mugnai, M. Scortichini***

15.00 - 15.12 REPORT OF '*CANDIDATUS LIBERIBACTER SOLANACEARUM*' IN COMMERCIAL APIACEAE SEEDS IN ITALY. V. Ilardi, E. Di Nicola, V. Lumia and M. Tavazza

15.12 - 15.24 COMPARATIVE STUDY AMONG *NEOFABRAEA* SPP. ITALIAN ISOLATES. I. Cameldi, F. Neri, M. Meneghini, I. M. Nanni, M. Collina and M. Mari

15.24 - 15-36 AMPLICON METAGENOMICS ANALYSIS OF THE FUNGAL MICROBIOME IN APPLE FRUIT. A. Abdelfattah, M. Wisniewski, S. Droby, S. Mosca, S. O. Cacciola and L. Schena

15.36 - 15.48 CHICORY AND *NEOALITURUS FENESTRATUS* AS NATURAL HOSTS OF *SPIROPLASMA CITRI* IN FRIULI VENEZIA GIULIA (NORTH-EAST ITALY). P. Ermacora, M. Martini, C. Polano, R. Musetti, F. Ferrini, P. Saitonuang, N. Loi and G. Firrao

16.00 - 18.30 **Assemblea sociale**

20.30 **Cena sociale**

Mercoledì 21 settembre 2016

Tarza Sessione **II - Plant diseases, pathogen characterization and epidemiology**

Moderatori: ***L. Covarelli, C. Ratti***

9.00 - 9.12 GENETIC DIVERSITY AND POPULATION STRUCTURE OF *FUSARIUM FUJIKUROI* CAUSING THE BAKANAE OF RICE IN ITALY. M. T. Valente, F. Desiderio, A. Infantino, G. Valè, P. Abbruscato and M. Aragona

9.12 - 9.24 THE COMPLEX FUSARIUM COMMUNITY ASSOCIATED TO HEAD BLIGHT OF MALTING BARLEY CAUSES MULTI-MYCOTOXIN GRAIN CONTAMINATIONS. M. T. Senatore, G. Beccari, F. Tini, M. Sulyok and L. Covarelli

9.24 - 9.36 BROWN APICAL NECROSIS (BAN) OF WALNUT FRUIT: A CASE OF STUDY OF A COMPLEX FUNGAL DISEASE. M. Scotton, E. Bortolin, A. Fiorin and A. Belisario

9.36 - 9.48 MORPHOLOGICAL, MOLECULAR AND BIOLOGICAL APPROACHES TO CHARACTERIZE CITRUS-ASSOCIATED ALTERNARIA SPECIES. F. Garganese, L. Schena, I. Siciliano, M.I. Prigigallo, D. Spadaro, A. De Grassi, A. Ippolito and S. M. Sanzani

9.48 - 10.00 CHARACTERIZATION AND VARIABILITY OF *LASIODIPLODIA* SPP. ASSOCIATED WITH CROWN ROT DISEASE UNDER ORGANIC FARMING OF BANANAS IN THE DOMINICAN REPUBLIC. M. A. M. Kamel, P. Cortesi and M. Saracchi

10.00 - 10.12 THE FIRST ARBOVIRUS FROM A PHYTOPLASMA INSECT VECTOR. S. Abbà, L. Galetto, M. Vallino, M. Turina and C. Marzachì

10.12 - 10.42 *Coffee break* e registrazione partecipanti alla sola giornata sulla protezione delle colture

Quarta Sessione **I - Diseases control**

10.42 - 11.12 *Relazione su invito:* FUNGICIDE RESISTANCE MANAGEMENT IN PRACTICE; MIXTURES, ALTERNATIONS AND CROSS RESISTANCE PATTERNS. Richard Oliver (Curtin University, Australia)

Moderatori: ***G. Romanazzi, C. Fanelli***

11.12 - 11.24 BIOCONTROL COMPOUNDS FROM *TRAMETES VERSICOLOR* ARE NEW TOOLS TO CHALLENGE FUNGAL PATHOGENS. A. Parroni, P. Cescutti, R. Rizzo, M. Scarpari, C. Pietricola, M. Reverberi and C. Fanelli

11.24 - 11.36 EFFECTIVENESS OF PLANT ESSENTIAL OILS AGAINST ZUCCHINI POWDERY MILDEW. L. Donnarumma, E. Sturchio, F. Milano, P. Boccia, M. Zanellato and T. Annesi

11.36 - 11.48 BOOSTING SUSTAINABLE BIOENERGY PRODUCTION BY MEANS OF TRICHODERMA. G. Manganiello, A. Sacco, A. Pascale, F. Vinale, M. R. Ercolano, J. P. Vogel, I. V. Grigoriev, H. Shanakhat, M. Lorito and S. L. Woo

11.48 - 12.00 BIOSAFETY AND ENVIRONMENTAL CONCERNS RELATED TO THE USE OF BACTERIAL BIOCONTROL AGENTS IN CROP PROTECTION. E. Stefani

12.00 - 13.00 *Sessione Poster (numeri pari)* 82 Trichoderma

13.00 - 14.30. *Pranzo di lavoro*

Quarta Sessione **II - Diseases control**

Moderatori: ***M. Lorito, E. Stefani***

14.30 - 14.42 DESIGN OF A PROTOTYPE FORMULATION FOR THE IMPROVEMENT OF LEAF COLONIZATION AND PLANT PROTECTION EFFICACY OF THE BIOCONTROL AGENT *LYSOBACTER CAPSICI* AZ78 UNDER FIELD CONDITIONS. G. Puopolo, G. Segarra, E. Porcel-Rodríguez, S. Tomada, O. Giovannini and I. Pertot.

14.42 - 14.54 ACTINOBACTERIA: ISOLATION, IDENTIFICATION, CHARACTERIZATION AND PRELIMINARY EXPERIMENTS FOR THEIR POSSIBLE USE AGAINST *CLAVIBACTER MICHIGANENSIS* SUBSP. *MICHIGANENSIS*. M. Ferrari, O. Kaewkla, C. Franco, D. Giovanardi and E. Stefani

14.54 - 15.06 NOVEL REGULATORS OF DEFENSE HORMONAL CROSSTALK UNRAVELED BY GENOME-WIDE ASSOCIATION STUDY. S. Proietti, L. Caarls, S. Coolen, S.C.M. Van Wees, C.M.J. Pieterse

15.06 - 15.18 INDUCED RESISTANCE AS A TOOL THAT CAN CONTRIBUTE TO SUSTAINABLE MANAGEMENT OF PRE- AND POSTHARVEST DISEASES OF PLANTS. G. Romanazzi, L. Landi, S. Murolo, E. Feliziani, V. Mancini, A. Servili, R. Foglia, S. Sabovic, M. Magini and S. Sanzani

15.18 - 15.30 ALTERNATIVE MEANS FOR CONTROLLING POSTHARVEST DISEASES OF STORED FRUITS. S. M. Sanzani and A. Ippolito

15.30 - 15.42 SURVIVAL VARIABILITY OF CALONECTRIA SPP. EXPOSED TO LABEL AND SUB-LABEL RATES OF FUMIGANTS APPLIED UNDER VIF AND TIF MULCH FILMS. D. Aiello, R. F. Alfenas,V. Guarnaccia, A. Vitale, A. C. Alfenas and G. Polizzi

15.42 - 16.12 *Coffee break*

16.12 - 16.24 COMBINING CHEMICAL AND BIOLOGICAL MEANS FOR THE CONTROL OF CALONECTRIA DISEASES IN ORNAMENTAL PLANTS. A. Vitale, A. Cinquerrui, D. Aiello, G. Cirvilleri and G. Polizzi

16.24 - 16.36 EFFECTIVENESS DIFFERENCES OF CARBOXYLIC ACID AMIDES FUNGICIDES TOWARDS *PLASMOPARA VITICOLA* POPULATIONS: *IN VIVO* TESTS AND MOLECULAR STUDIES ON PVCESA3 GENE. I. M. Nanni and M. Collina

16.36 - 16.48 INTEGRATED AND INNOVATIVE KEY ACTIONS FOR MYCOTOXIN MANAGEMENT IN THE FOOD AND FEED CHAIN (HORIZON2020 PROJECT MYCOKEY). A. Moretti and A. Logrieco

Giovedì 22 settembre 2016

Tavola rotonda

I - Protezione delle colture

8.30 - 9.00 Registrazione partecipanti alla sola giornata sulla protezione delle colture

9.00 - 9.20 IL RUOLO ISTITUZIONALE NELLA PROTEZIONE DLLE COLTURE. B. Faraglia, MiPAAF - Servizio fitosanitario centrale, produzione vegetale

9.20 - 9.40 IL BIOLOGICO NELLA DIFESA DELLE PIANTE: QUALE FUTURO? R. Cafiero, MiPAAF - Agricoltura biologica e sistemi di qualità alimentare nazionale e affari generali.

9.40 - 10.00 RECENTI NORMATIVE PER UN'AGRICOLTURA SOSTENIBILE. F. Mazzini, Servizio Fitosanitario, Regione Emilia-Romagna

10.00 - 10.20 Domande

10.20 - 10.50 *Coffee break*

II - Il ruolo dell'industria nella protezione delle colture

10.50 - 11.10 IL RUOLO DELLA RICERCA E DELL'INNOVAZIONE NELLA PROTEZIONE DELLE COLTURE: ILCONTRIBUTO DI ISAGRO. R. Liguori, Isagro SpA.

11.10 - 11.30 SYNGENTA: RICERCA E SVILUPPO MOTORE DELL'INNOVAZIONE. M. Coatti, Syngenta Italia SpA

11.30 - 11.50 LE MICORRIZE ARBUSCOLARI E IL TRICHODERMA ATROVIRIDE: DUE ALLEATI PER MIGLIORARE LA FERTILITÀ DEL SUOLO E POTENZIARE GLI APPARATI RADICALI DELLE COLTURE. L. Dragoni, Italpollina SpA

11.50 - 12.10 IL CONTRIBUTO DI CERTIS EUROPE PER UN GESTIONE INNOVATIVA E SOSTENIBILE DELLE AVVERSITÀ TELLURICHE. A. Santori, Certis Europa B.V Filiale Italiana

12.10 - 13.00 Domande e Discussione

Chiusura XXII Convegno Nazionale SIPaV. G. Vannacci (Presidente SIPaV)

PREMIO SCARAMUZZI

ECOLOGY AND EPIDEMIOLOGY OF THE EMERGING PLANT PATHOGEN *GNOMONIOPSIS CASTANEAE*

G. Lione

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Gnomoniopsis castaneae is an emerging fungal pathogen causing nut rot on *Castanea sativa*, or living as an endophyte in the green tissues of the tree. The disease has been reported since the mid-2000s in European countries such as Italy, France and Switzerland. To date, the ecology and the epidemiology of *G. castaneae* have been mostly unexplored. The main goals of this work were: I) testing the association between the climate and the incidence of *G. castaneae*; II) assessing the influence of the plantation density on the spatial pattern of the nut rot infection through the development of a new geostatistical test; III) investigating some possible ecological interactions between *G. castaneae* and the exotic pest *Dryocosmus kuriphilus* (Asian chestnut gall wasp); and IV) comparing a large set of *Castanea* spp. cultivars and the wild-type of *C. sativa* to assess their levels of susceptibility to *G. castaneae.*

A combined approach involving isolations, molecular analyses and the application of non-conventional statistical techniques was used. The methods were adapted depending on the specific aims of each experiment. In 2011, based on the inspection of 12 sites, the incidence of *G. castaneae* in north-western Italy was comprised between 20% and 93%. Climatic analyses showed that warmer temperatures were associated with higher levels of *G. castaneae* incidence, while no significant effect of the rainfall was detected. A series of models (*Gno*Mods) was fitted, resulting in equations predicting the incidence of the disease at site level as a function of the temperatures of the months before harvesting. The *Gno*Mods were significant ($P<0.05$) and provided good predictive performances, as shown by the strong correlation between observed and predicted values resulting from the external validation (Spearman $\rho>0.72$; $P<0.05$).

The comparison of areas with the same number of chestnut trees significantly clustered ($P<0.05$) or randomized ($P>0.05$) indicated that the spatial distribution of the trees carrying nuts infected by the pathogen was randomized ($P>0.05$), regardless of the plantation density. The incidence of trees infected was not significantly different among areas (52.9%-71.4%; $P>0.05$). The results suggest that the plantation density was not related to the spatial distribution of *G. castaneae*. To perform these analyses, new geostatistical tests (Mean Distance Tests - MDT) were developed, validated and embedded in a user-friendly software. MDT displayed reliable outcomes (power>80%; type I error<0.05) and can be applied to test the spatial pattern of any plant disease when the variable of phytopathological interest is categorical.

DNA analyses showed that 40% of the adults of *D. kuriphilus* emerging from galls colonized by *G. castaneae* carried inoculum of the pathogen, yet the inoculum was not viable, since no fungal colonies could be isolated. Consequently, the pest is an unlikely vector of *G. castaneae*. On average, the emerging adults were significantly more abundant in galls colonized than in galls not colonized by the fungus (3.76 *vs.* 2.54, $P<0.05$), indicating a possible fungus/pest synergy. The combined results of the Monte Carlo simulations, validated by isolation trials on chestnut buds inspected for *D. kuriphilus* eggs, showed that *G. castaneae* colonized 33.8% of the buds before oviposition, and that fungal colonization and oviposition were not associated (odds ratio 0.98, 0.71-1.33 95% CI). Consequently, the higher number of insects in galls colonized by *G. castaneae* might have been the effect of an interaction occurring after oviposition, probably during the insect development.

The incidence of *G. castaneae* was compared between 85 chestnut cultivars and the wild-type of *C. sativa* growing in homogeneous environmental conditions. The statistical analyses showed that only cultivars significantly more susceptible ($P<0.05$) than the wild-type (22% of the total number of cultivars in 2013 and 55% in 2014) could be identified. *G. castaneae* was isolated not only from *C. sativa* nuts, but also from nuts of Asian chestnut species and hybrids. The validation analysis revealed no significant association between the most susceptible cultivars detected in 2013 and 2014 (odds ratio 2.85; 0.18-176.61 95% CI). The results suggest that the levels of susceptibility of the chestnut cultivars and the wild-type were substantially homogeneous.

In conclusion, the temperatures are strongly associated with the incidence of *G. castaneae*, while the plantation density of the orchards, the interaction with *D. kuriphilus* and the chestnut cultivars seem to play a negligible, or minor, role in the epidemiology of this plant pathogen.