



University of Torino

Department of Agricultural, Forest and Food Sciences



Eurochestnut Network

Thematic Group: Fungi Associated with Nut Rots

The nut rots of chestnut and the emerging pathogen *Gnomoniopsis castaneae*: state of the art and perspectives



ASSEMBLÉE DES RÉGIONS EUROPÉENNES FRUITIÈRES, LÉGUMIÈRES ET HORTICOLES
ΕΝΩΣΗ ΕΥΡΩΠΑΪΚΩΝ ΠΕΡΙΦΕΡΕΙΩΝ ΠΑΡΑΓΩΓΗΣ ΦΡΟΥΤΩΝ ΚΑΙ ΛΑΧΑΝΙΚΩΝ
ASSEMBLEA DELLE REGIONI EUROPEE FRUTTICOLE ORTICOLE E FLORICOLE
ASAMBLEA DE LAS REGIONES EUROPEAS HORTOFRUTICOLAS

Paolo GONTHIER

Eurochestnut Network

Thematic Group: Fungi Associated with Nut Rots

Country	Institution	Researchers (R)/Professionals (P)
Italy	University of Torino - DISAFA	Paolo Gonthier (Coordinator) (R)
	University of Tuscia - DIBAF	Anna Maria Vettraino (R)
	CNR - Istituto per la Protezione Sostenibile delle Piante (IPSP)	Roberto Danti (R) Tullio Turchetti (R)
France	INRA Bordeaux	Cécile Robin (R)
	Chambre Régionale d'Agriculture Languedoc-Roussillon Midi-Pyrénées	Anne Boutitie (P)
	Chambre d'Agriculture d'Ardèche	Hélina Deplaude (P)
	INVENIO	Guillaume Pagès (P) Nathalie Pasquier (P)
Hungary	University of Debrecen - Institute of Plant Protection	Laszlo Radocz (R)
Portugal	University of Trás-os-Montes and Alto Douro	Jorge Ferreira Cardoso (R) Guilhermina Marques (R)
Switzerland	University of Applied Sciences and Arts, Western Switzerland - Life Science Department	François Lefort (R)
	Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)	Joana Beatrice Meyer (R) Simone Prospero (R)

Nut rot of chestnut in pre-harvest and post-harvest conditions

Botrytis cinerea

Ciboria batschiana

Cytodiplospora castanea

Diplodina castaneae

Dothiorella spp.

Fusarium spp.

Penicillium spp.

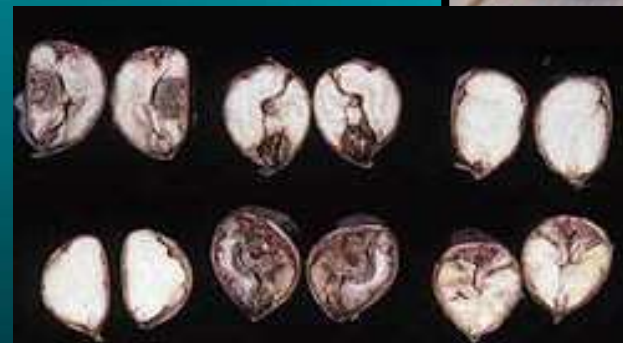
Pestalotia spp.

Phoma castanea

Phomopsis endogena

Phomopsis viterbensis

Rhizopus spp.



An emerging nut rot of chestnut

Journal of Plant Pathology (2012), 94 (2), 411-419 Edizioni ETS Pisa, 2012

***GNOMONIOPSIS CASTANEA* sp. nov. (GNOMONIACEAE, DIAPORTHALES)
AS THE CAUSAL AGENT OF NUT ROT IN SWEET CHESTNUT**

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Since 2005:

incidence
30-90%

Healthy



Symptomatic



Teleomorph (perithecia)



Anamorph (acervuli)



An emerging nut rot of chestnut

Gnomoniopsis castaneae





KEY

POINTS

An emerging nut rot of chestnut

Phytopathologia Mediterranea (2015) 54, 2, 199–211

DOI: 10.14601/Phytopathol_Mediterr-14712

RESEARCH PAPERS

Gnomoniopsis castanea is the main agent of chestnut nut rot in Switzerland

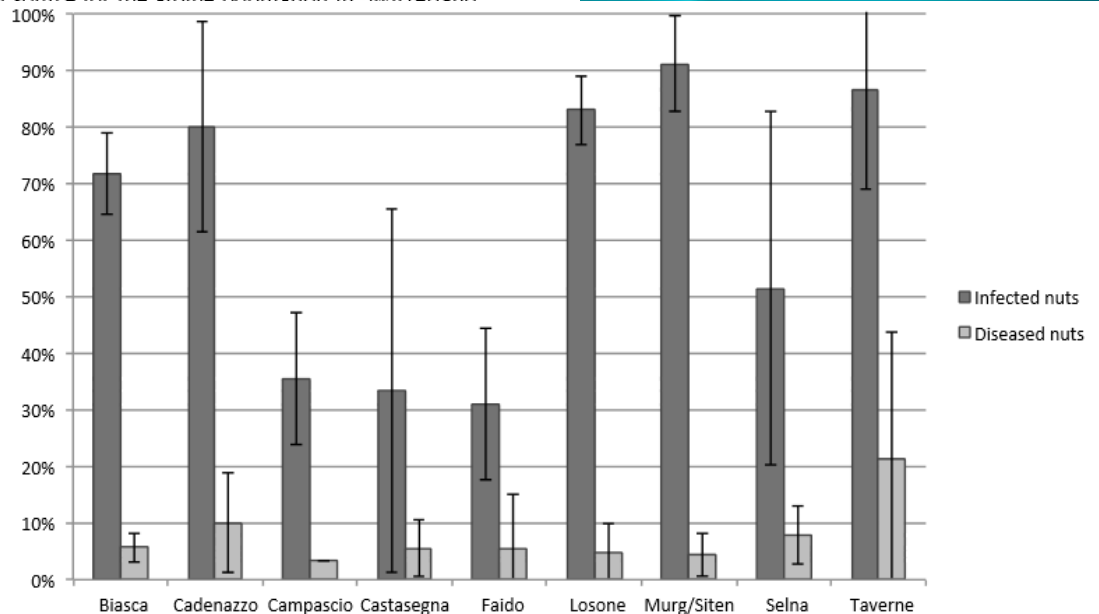
FRANCESCA G. DENNERT¹, GIOVANNI A.L. BROGGINI^{1,3}, CESARE GESSLER¹ and MICHELANGELO STORARI^{1,2}

¹ ETH Zürich, Institute of Integrative Biology, Plant Pathology Group, Universitätsstrasse 2, 8092 Zürich

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Summary. Nuts of sweet chestnut have been an important food source for the alpine population in Switzerland since the Middle Ages and are still valued today for the preparation of chestnut flour.



Average percentage of infected nuts (from which *Gnomoniopsis castanea* was isolated) and diseased nuts

KEY POINTS



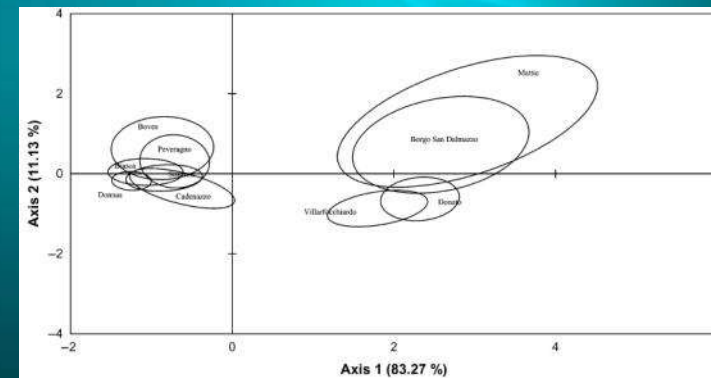
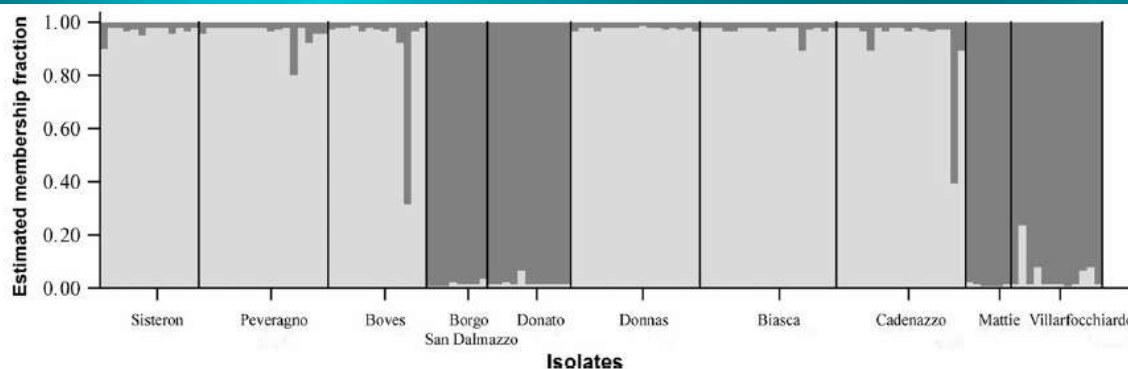
HRM analysis provides insights on the reproduction mode and the population structure of *Gnomonopsis castaneae* in Europe

F. Sillo^a, L. Giordano^{ab}, E. Zampieri^a, G. Lione^a, S. De Cesare^a and P. Gonthier^{ax}

Two distinct subpopulations of *G. castaneae* are present in Europe

At least one subpopulation might have been introduced to Europe

High genetic differentiation along with absence of linkage disequilibrium suggest that sexual reproduction might be prevalent



KEY POINTS

***G. castaneae* and the nut rot fungus present in Australasia (*G. smithogilvyi*) are the same species (current name: *G. castaneae*)**

***G. castaneae* is associated with canker symptoms on chestnut and hazelnut**



Pasche *et al.*, 2016

Promising results have been obtained from *Bacillus amyloliquefaciens* and *Trichoderma atroviride* which seem to be suitable candidates for the biological control of *G. castaneae*

STRONG POINTS	WEAK POINTS AND POINTS NEEDING FURTHER INVESTIGATIONS
<p><i>G. castaneae</i> is diffused worldwide and it is associated with both nut rot and canker symptoms</p> <p>The fungal species is both a pathogen and an endophyte</p> <p>The incidence of the nut rot is related to the temperatures and it is locally predictable, while it is not influenced by the plantation density</p> <p>At least two distinct subpopulations are present in central-southern Europe</p> <p>Sexual reproduction is prevalent</p> <p><i>G. castaneae</i> interacts positively with <i>Dryocosmus kuriphilus</i> increasing its spreading potential</p> <p>Promising results have been obtained from <i>Bacillus amyloliquifaciens</i> and <i>Trichoderma atroviride</i>, which seem to be suitable candidates for the biological control of <i>G. castaneae</i></p>	<p>European distribution area of <i>G. castaneae</i> and other nut rot agents</p> <p>Risk maps</p> <p>Worldwide distribution of <i>G. castaneae</i> populations</p> <p>Transmission and possible introduction pathways</p> <p>Susceptibility profiles of different chestnut cultivars and wild-type</p> <p>Effects of management practices in coppices (canker) and in orchards (canker and nut rot)</p> <p>Interactions with <i>Dryocosmus kuriphilus</i>, hazelnut and other fungal pathogens causing nut rot</p> <p>Relations among endophytism, latency and pathogenicity</p> <p>Control strategies</p>

Research

**Local
institutions**

Application

Formation

**Technology
transfer**

Sensibilization

Dissemination

Funding

Knowledge

**In field
support**

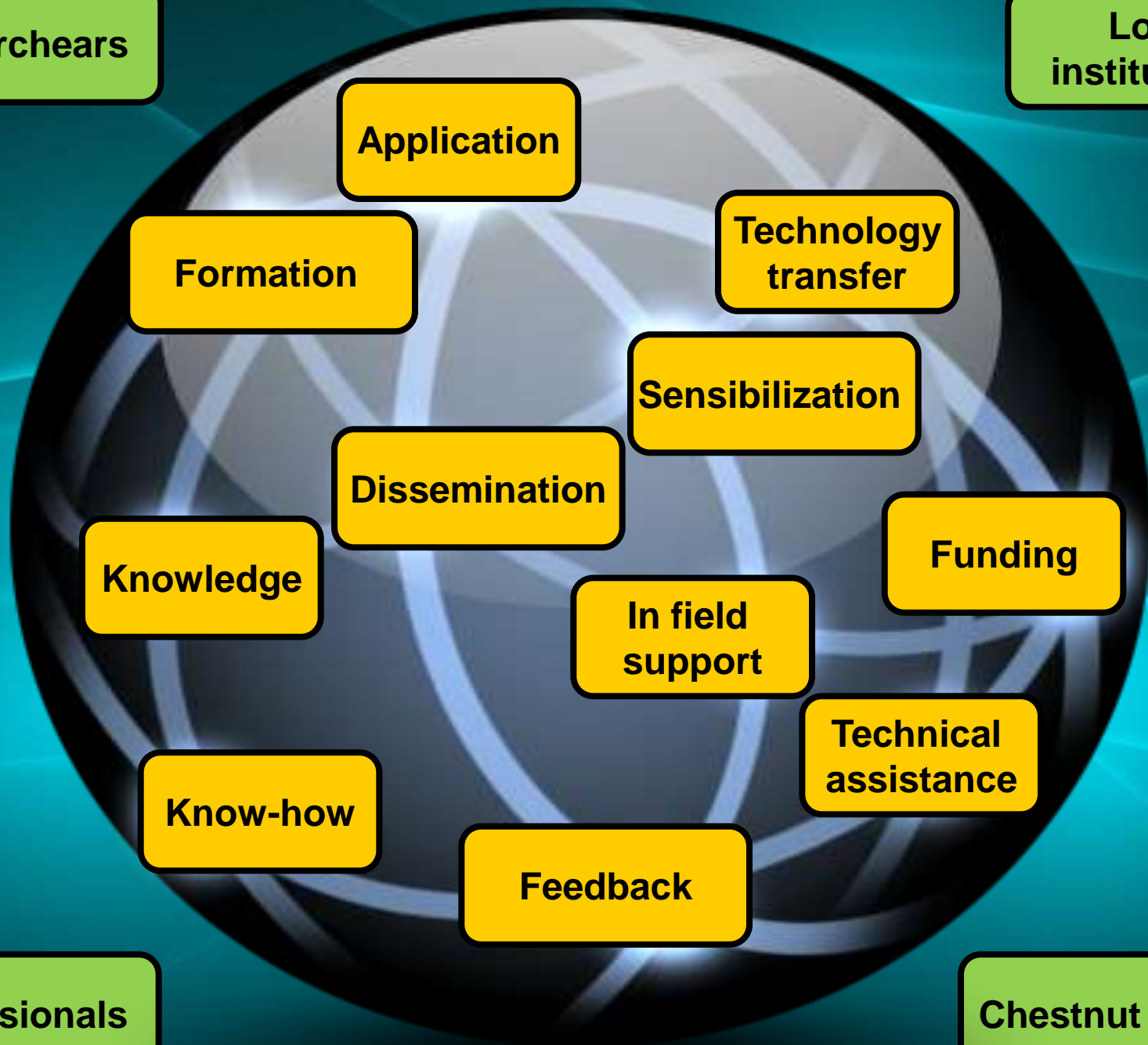
**Technical
assistance**

Know-how

Feedback

Professionals

Chestnut growers





Thank you for your attention