

## Curriculum Vitae

### Personal information

First name/Surname

**Maria Alexandra CUCU**

Address

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CF:

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Nationality

Romanian

Gender

Female

### Qualifications

Doctorate

**Doctorate degree in Agricultural, Forestry and Food Sciences, EQF level 8**

Dept. of Agricultural, Forest and Food Sciences, Agricultural Chemistry and Pedology, University of Turin, Italy.

From 01 January 2010 – To 26 February 2014 (Date of conferment: 26 February 2014, degree **Excellent**)

PhD thesis title: *“Redox conditions and rice straw management drive nitrogen dynamics in temperate paddy soils”*

Post-graduate

**Masters in Science, degree in Plant Protection, EQF level 7**

Dept. of Plant Protection, University of “Al. I. Cuza”, Iasi, Romania

From 2003 – To 2005 (Date of conferment: June 2006, degree 10/10)

MSc thesis title: *“Biochemical aspects of the Oidiodendron maius mycelium interactions with metals Cr and Ni in mycorrhizal ericoid associations from the serpentinitic soils of Natural Park Mont Avic, Italy”*

Graduate

**Bachelor degree in Biology, EQF level 7**

Faculty of Biology, University of “Al. I. Cuza”, Iasi, Romania

From 1998 – To 2002 (Date of conferment: June 2003, degree 8,37/10)

BSc thesis title: *“Structure of aers vegetative organs from Pisum sativum L. and Vicia faba L. (Fabaceae) and possible modifications induced by the treatment with Folifag 0,5%”*.

### Professional Experience

Dates

From 1 February 2023 – present

Position held

**Fixed Term Researcher**

Institution

Departments of Medicine and Experimental & Clinical Biomedical Sciences “Mario Serio” – University of Florence, Italy

Dates

From 1 October 2020 – 31 December 2021

Position held

**Biotechnologist III level**

Institution

Council for research in agriculture and agricultural economy analysis - Research Centre for Agriculture and Environment – Florence, Italy

Dates

From 1 April 2019 – 31 March 2020

Position held

**Post Doc Research Assistant**

Institution

Dept. of Agricultural, Forest and Food Sciences, Agricultural Chemistry and Pedology, University of Turin, Italy

Competence Centre for Innovation in Agro-Environmental Field – Agroinnova, University of Turin, Italy

Dates	From September 2016 – September 2018 September 2018 – March 2019
Position held	<b>Post Doc Research Assistant</b>
Institution	Competence Centre for Innovation in Agro-Environmental Field – Agroinnova, University of Turin, Italy
Dates	From August 2015 – September 2016
Position held	<b>Post Doc Research Assistant</b>
Institution	Dept. of Agricultural, Forest and Food Sciences, Food Technology and Agricultural Microbiology and Agricultural Chemistry and Pedology, University of Turin, Italy
Dates	From July 2014 – August 2015
Position held	<b>Post Doc Research Assistant</b>
Institution	Council for research in agriculture and agricultural economy analysis - Research Centre for the Soil - Plant System – Turin, Italy
Dates	From October 2013 – April 2014
Position held	<b>Research Fellow</b>
Institution	Dept. of Agricultural, Forest and Food Sciences, Agricultural Chemistry and Pedology, University of Turin, Italy
Dates	From January 2010 – February 2014
Position held	<b>PhD student</b>
Institution	Dept. of Agricultural, Forest and Food Sciences, Agricultural Chemistry and Pedology, University of Turin, Italy
Dates	From November 2007 – March 2008; From November 2008 – March 2009
Position held	<b>Marie Curie Research Training Fellow</b>
Institution	Dept. of Plant Biology, University of Turin, Italy
Dates	From April 2006 – September 2007
Position held	<b>Biochemist and microbiologist</b>
Institution	Private clinical laboratory MEDIMAR DIAGNOSTIC, Iasi, Romania
Dates	From 20 – 24 August 2007
Position held	<b>Molecular Biology Training Fellow</b>
Institution	Laboratory of Genetic and Immunology, Universities Hospital St. Spiridon, "University of Medicine and Pharmacy " Gr. T. Popa" Iasi, Romania
<b>Research Activities</b>	
Project title	<b><i>a) LIGHT4LUNGS - Inhalable Aerosol Light Source for Controlling Drug- Resistant Bacterial Lung</i></b>

	<b><i>Infections</i></b>
	<b><i>b) ENDOLIGHT - Illuminatore endoscopico per l'eradicazione dell'infezione da Helicobacter pylori</i></b>
Year (and duration)	<b><i>c) SAVES US - Suppression of Airborne Viral Epidemic Spread by Ultraviolet light barriers –</i></b>
	From 1 February – present
Type of funding	a) Grant Agreement number: 863102 - H2020-FETOPEN-2018-2019-2020-01 b) project financed with the decisive regional contribution from the POR CReO FESR Toscana 2014-2020, R&D 2020 call
Role in project	c) project funded by the Tuscany Region under the COVID 19 Tuscany Regional Research Call  <b>Fixed Term Researcher (Microbiologist, biotechnologist)</b>
Project title	
	<b><i>LIFE GREEN GRAPES - New approaches for protection in a modern sustainable viticulture: from nursery to harvesting - LIFE GREEN GRAPES</i></b>
Year (and duration)	
	From 1 October 2020 – 31 December 2021 (15 months)
Type of funding	
Role in project	LIFE Environment and Resource Efficiency - LIFE16 ENV/IT/000566  <b>Fixed Term Researcher (Bioinformatician)</b>
Project title	
	<b><i>Precision feeding with oil pomace: modulation of the metabolism of dairy cows for the development of new nutraceutical dairy products - EVOLAT</i></b>
Year (and duration)	
	From 1 October 2020 – 30 September 2021 (15 months)
Type of funding	
Role in project	D.M.N. 27443 of 25/09/2018 "Public selection - milk fund research projects", on G.U.R.I. of 18/10/2018 general series n. 243  <b>Fixed Term Researcher (Bioinformatician, biotechnologist)</b>
Project title	<b><i>Epidemiological and microbiological aspects of pathogenic agents of plants diseases</i></b>
Year (and duration)	01 April 2019 – 31 March 2020 (12 months)
Type of funding	Co-financing: Ministry of Education, University and Research (MIUR) and European Union's Horizon 2020 research and innovation programme under grant agreement no. 817946- <b>“Exploiting the multifunctional potential of belowground biodiversity in horticultural farming”-‘EXCALIBUR’</b>
Role in project	<b>Post Doc Research Assistant</b>
Project title	<b><i>Characterization of microbial populations (pathogens and antagonists) in soil and compost</i></b> <b><i>Crop defence and microbial populations</i></b>
Year (and duration)	From September 2016 – September 2018 (24 months) September 2018 – March 2019 (6 months)
Type of funding	European Commission under Horizon 2020 funding under <b>EUCLID – EU – China Lever for IPM Demonstration</b> , Grant Agreement number: 633999 European Union's Horizon 2020 research and innovation programme under grant agreement no.634179 <b>‘Effective Management of Pests and Harmful Alien Species – Integrated Solutions’ (EMPHASIS)</b>
Role in project	<b>Post Doc Research Assistant</b>

Project title	<b><i>Effect of soil management on prokaryotic dynamics in paddy field</i></b>
Year (and duration)	From August 2015 – To September 2016 (12 months)
Type of funding	Italian funding under <b>CarboPAD project</b> financed by the Italian Ministry of Education, University and Research (MIUR) within the framework <b>FIRB2013</b>
Role in project	<b>Post Doc Research Assistant</b>
Project title	<b><i>Study of microbial communities involved in GHGs emissions in rice paddies</i></b>
Year (and duration)	From July 2014 – To August 2015 (12 months)
Type of funding	Italian funding, Agricultural Research Council
Role in project	<b>Post Doc Research Assistant</b>
Project title	<b><i>Agronomic management effect on the availability and nutrient losses from the agricultural ecosystem</i></b>
Year (and duration)	From September 2013 – To April 2014 (8 months)
Type of funding	Italian funding, MIPAAF/INEA ( <b>“Sustaining the National Rice Industry through Research, Technology, Innovation and Formation “-“Ricerca, sperimentazione, tecnologie innovative, sostenibilità ambientale ed alta formazione per il potenziamento della filiera risicola nazionale - POLORISO</b> )
Role in project	<b>Research Assistant</b>
Project title	<b><i>Redox conditions and rice straw management drive nitrogen dynamics in temperate paddy soils</i></b>
Year (and duration)	From January 2010 - To February 2014 (4 years)
Type of funding	Italian funding (MiPAAF) and partly by International Society of Humic Substances (IHSS), under the project: <b>“Sustaining the National Rice Industry through Research, Technology, Innovation and Formation “ - POLORISO</b>
Role in project	<b>PhD student</b>
Project title	<b><i>Project: “Integral (Intensifying Training in Europe on Genomic Research Activity in Legumes)”</i></b>
Year (and duration)	10 months (2007-2009)
Type of funding	European funding
Role in project	<b>MARIE CURIE Research Assistant</b>
<b>International Research Activities</b>	
Hosting Institution	<b>University of Hohenheim – Stuttgart, Germany :</b> <ul style="list-style-type: none"> <li>• Institute of Soil Science and Land Evaluation Soil Biology Section</li> <li>• Institute of Plant Production and Agroecology in the Tropics and Subtropics, Plant Production Section</li> </ul>
Year (and duration)	From March 2012 - To September 2013 (18 months)
Type of funding	Doctorate School of Agricultural, Forest and Food Sciences by Italian Ministry of Agriculture, Food and Forestry (MiPAAF) and partly by International Society of Humic Substances (IHSS)
Role	Visiting Researcher
Hosting Institution	<b>Dept. of Vegetal Biology, University of Turin, Italy</b>
Year (and duration)	From September 2004 - To October 2005 (12 months)
Type of funding	Erasmus/Socrates funding
Role	Erasmus fellow

## Affiliation to Scientific Societies

- From December 2015 to present: member of Federation of European Microbiological Societies (FEMS) - and SIMITREA
- From July to present: Associate Member of Romanian Society of Microbiology (RSM)
- From September 2011 to present: member of Italian Soil Sciences Society (SISS)
- From December 2012 to present: member of International Humic Substances Society (IHSS)
- From January 2015 to 2017: member of Italian Agricultural Chemistry Society (SICA)
- From 30 July 2014 to present: member of International Society of Microbial Ecology (ISME)

## Scholarships, Bursaries and Awards

1. **2015: Best Doctoral Thesis Award from the Italian Association of Agricultural Science Societies (AISSA)**
2. January - March 2013: Beneficiary of a training award conferred by the International Humic Substance Society (IHSS) for a research period at Hohenheim University, Stuttgart, Germany
3. July 2012: Beneficiary of a travel bursary conferred by Italian Soil Sciences Society (SISS) for participation at the 4th International Congress Eurosoil, Soil Science for the Benefit of Mankind and Environment, Fiera del Levante, 02-06 July 2012 Bari, Italy
4. October 2011: Beneficiary of a financial support within "BANDO ALTA FORMAZIONE DI CUI ALLA D.D. 745 DEL 30/11/2009", for participation at high level schools, courses, October 2011
5. November 2007 - March 2008; From November 2008 - To March 2009: Beneficiary of a Marie Curie scholarship in the frame of European Project Integral (Intensifying Training in Europe on Genomic Research Activity in Legumes), Department of Plant Biology, Turin, Italy
6. September 2004 - September 2005: Beneficiary of Socrates/Erasmus scholarship, University of Turin, Italy, Department of Plant Biology

## Participation in congresses, courses and seminars

1. Incontri Fitoiatrici, 18 April 2018 Turin, Italy (**poster presentation**).
2. The 4<sup>th</sup> International Conference on Microbial Diversity – *Drivers of Microbial Diversity*, 24-26 October 2017, Bari, Italy (**oral presentation**).
3. Course of "Computational methods for analysis of biological data", 6-8 July 2016, Turin, Italy.
4. European Geosciences Union General Assembly (EGU), 77-22 April 2016 – (**poster presentation**).
5. The 40th National Congress of the Italian Society of Soil Science, 2-4th December 2015, Rome, Italy (**oral presentation**).
6. Ecology of soil microorganisms – Microbes as Important Drivers of Soil Processes – 29 november-3 december 2015 | Prague, Czech Republic (**poster presentation**).
7. XIII Congress of Italian Association of Agricultural Science Societies, 26-27 November, Turin|Italy (**oral presentation of PhD thesis**).
8. Workshop "Managing Water Quality for Public Health", 14 October 2015, Grugliasco, Dept. of Agricultural, Forest and Food Sciences (DISAFA), Turin University, Turin|Italy.
9. The microbial continuity across changing ecosystems - BAGECO 2015 ( Bacterial genetics and ecology) 14-18 June 2015 | Milan, Italy (**poster presentation**).
10. 19<sup>th</sup> Alpine Glaciology Meeting 7 – 9 May 2015 Milan|Italy.
11. 38° Edizione Fiera in Campo Vercelli fiere " *Risicoltura innovative e conservative. Un paradosso?*", 27 February, 2015, Caresanablot Vercelli, Italy.
12. Ph.D. Winter School Feeding the world: the contribution of research in agricultural chemistry to sustainable development, 9-12 February 2015, Piacenza, Italy (**poster presentation**).
13. THE FIRST GLOBAL SOIL BIODIVERSITY CONFERENCE – " *Assesing soil biodiversity and role in ecosystem services* ", December 2-5, 2014, Dijon, France (**poster presentations**).
14. 15th Symposium on Microbial Ecology, 24-29 august 2014, Seoul, South-Korea (**oral presentation**).
15. XXXII National Congress of Italian Society of Agricultural Chemistry: " *Il potenziale biologico del sistema pianta-microorganismi-suolo come chiave della sostenibilità e qualità delle produzioni* ", 7-9 September 2014, Bolzano, Italy (**oral presentation**).
16. International Workshop: "Biogeochemistry of submerged agro-ecosystems: Properties,

processes, cycles and functions” 21 - 25 September, 2014, Freising, Germany **(oral presentation)**

17. Seminar, 20 June, 2014, Univ. Milano, Italy: *“Paddy field agriculture and water conservation: Monitoring and SWAT model application”* – Tasuku Kato, Tokyo University of Agriculture and Technology.
18. The 8<sup>th</sup> National Assembly LTER-Italy: *“La rete LTER Italia e le aree protette: ricerche ecologiche di lungo termine e tutela dell’ambiente”*, 14-15 May, Turin University, Italy.
19. Workshop *“Interconnecting Carbon and Nitrogen biogeochemical cycles in soils”*, 26 February 2014, DISAFA, Turin University, Italy.
20. General Assembly: *“Sistemi innovativi per una gestione sostenibile dell’acqua in risaia”*, 30 January 2014, Castello d’Agogna (PV), Italy.
21. Seminar, 13 May 2013, Univ. Hohenheim, Soil Biology Section, Germany – *“Position-specific labelling - a new tool to trace the fate of C in soil”* - Prof. Dr. Yakov Kuzyakov, Dept. of Soil Science of Temperate Ecosystems/Dept. of Agricultural Soil Science, University of Goettingen, Germany.
22. European Geoscience Union General Assembly (EGU), 7-12 April 2013 – **(poster presentation)**.
23. Seminar, 03 December, 2012, Univ. Hohenheim, Soil Biology Section, Germany: *“Modelling of microbial carbon and nitrogen turnover in soil and greenhouse gases emission”*- Dr. Sergey Blagodatskiy, Institut für Pflanzenproduktion und Agrarökologie in den Tropen und Subtropen, Universität Hohenheim, Germany.
24. DBG Kommission III, Bodenbiologie und Bodenökologie (*“Living soil”*), Universität Hohenheim, Stuttgart, Germany, 20-21 September 2012 **(oral presentation)**.
25. Stable isotope workshop, Institute of Plant Production and Agroecology in the Tropics and Subtropics, 18 September 2012, Hohenheim University, Germany.
26. 4<sup>th</sup> International Congress Eurosoil, Soil Science for the Benefit of Mankind and Environment, Fiera del Levante, Bari, Italy, 2-6 July 2012 (poster presentation).
27. Seminar, 21 May 2012, Univ. Hohenheim, Germany: *“Diffusion of nitrous oxide into soil columns: a method to understand complete denitrification of N<sub>2</sub>O in agricultural soils”*- Roland Klefoth, Environmental Sciences, Soil Science Centre, Wageningen UR, NL.
28. Distinguished lectures 2011, Uni Torino: *“Il ciclo del carbonio dalla degassazione del mantello all’atmosfera”* : *“Il ciclo profondo del carbonio: rilascio e il trasporto di CO<sub>2</sub> dal mantello all’atmosfera”* – Maria Luce Frezzotti, Univ. Di Siena; *“Microorganismi e il ciclo del carbonio: il Grande gioco dei flussi globali”*- Roberto Barbieri, Uni. Bologna, Italy.
29. Day of study for PhD students and Young researchers – *“La biodiversità microbica e la diversità funzionale del suolo”*, 7 November 2011, Florence, Italy.
30. Functions of microbial communities in soils: *“Sustainable use of biotic resources”*. Summer school 2011 October 4<sup>th</sup>-14<sup>th</sup>, Munich, Germany.
31. XXIX National Congress of Italian Society of Agricultural Chemistry, 21-23 September 2011, Foggia, Italy **(oral presentation)**.
32. VII Brazilian Congress on Irrigated Rice, 9-12 August 2011, Santa Catarina, Brazil **(oral presentation)**.
33. Technical day *“Soluzioni operative per la delocalizzazione e l’utilizzo dei reflui zootecnici: un’opportunità per allevatori e frutticoltori”*, 13 May 2011, Rivalta di La Morra, Italy.
34. *“La delocalizzazione dei reflui zootecnici: un’opportunità per allevatori e frutticoltori”*- General assembly, 3 May 2011, Fossano (CN), Italy.
35. Day of study for PhD students and young researchers: *“Nutrizione azotata nei sistemi agrari e forestali - Implicazione nel sequestro del carbonio”*, 6 October 2010, Bologna, Italy.
36. *“La risicoltura verso la produzione integrata: risultati di una sperimentazione di lungo periodo”*, General assembly, 26 February 2010, Vercelli, Italy.
37. Corso breve sulle Nuove Pedogenesi, 2-3 October 2010, Ormea, Italy.
38. 7<sup>ème</sup> école d’été franco-roumaine de biochimie *“Biologie et Pathologie Moléculaires. Biotechnologies”*, 25 Juin-7 Juillet 2001, Iasi, Romania
39. Course of training in Molecular Biology, Genetics and Immunology, Univ. Hospital St. Spiridon, “Univ. di Medicina e Farmacia” Gr. T. Popa”, 20-24 August 2007, Iasi, Romania.

## Reviewer activity

ISI Journals: Environmental Science: Processes & Impacts, April , June, July 2014; Applied Soil Ecology, October 2015 ; Rice Science, November 2015; Agriculture, March 2017; Applied Soil Ecology, October 2017; February 2018; Environmental Technology Journal, Geoderma, April 2018; Journal of Integrative Agriculture, January 2018; Journal of Applied Microbiology, July 2018

## Publications

- Nencioni A., Pastorell, R., Bigiott, G., **Cucu M.A.**, Sacchetti P. 2003. Diversity of the Bacterial Community Associated with Hindgut, Malpighian Tubules, and Foam of Nymphs of Two Spittlebug Species (Hemiptera: Aphrophoridae). **Microorganisms** – 11: 466. <https://doi.org/10.3390/microorganisms11020466>
- Pastorelli R., **Cucu M.A.**, Lagomarsino A., Paletto A., De Meo I. Analysis of Ciliate Community Diversity in Decaying Pinus nigra Logs. Forests. 2022; 13(5):642. <https://doi.org/10.3390/f13050642>
- Storchi P., Perria R., Carella G.A., Mugnai L., Landi S., Binazzi F., Mocali S., Fabiani A., **Cucu M.A.**, Valentini P., Petrucci W.A., Puccioni S., & Ciofini A., 2022. Soil management and plant protection strategies with reduced use of copper: productive and environmental aspects in a Sangiovese vineyard. BIO Web of Conferences
- Cucu M.A.**, Gilardi G., Pugliese M., Ferrocino I., Gullino M.L., 2020. Effectiveness of the biological control of *Phytophthora capsici* in a zucchini crop by means of biocontrol agents and compost and the impact on the rhizosphere microbiota. Per rev: **Applied Soil Ecology** – 154:103659. doi: 10.1016/j.apsoil.2020.103659
- Bellini A., Ferrocino I., **Cucu M.A.**, Pugliese M., Garibaldi A., Gullino M.L., 2020. A Compost treatment acts as a suppressive agent in *Phytophthora capsici* – *Cucurbita pepo* pathosystem by modifying the rhizosphere microbiota Per rev: **Front. Plant Sci.**, <https://doi.org/10.3389/fpls.2020.00885>
- Cucu M.A.**, Gilardi G., Pugliese M., Gullino M.L., Garibaldi A. 2020. An assessment of the modulation of the population dynamics of pathogenic *Fusarium oxysporum* f. sp. *lycopersici* in the tomato rhizosphere by means of the application of *Bacillus subtilis* QST 713, *Trichoderma* sp. TW2 and two composts. Per rev: **Biological control**, 142 (2020) 104158, 1-10.
- Cucu M.A.**, Gilardi G., Pugliese M., Matic S., Ulrich G., Gullino M.L., Garibaldi A. 2018. Influence of different biological control agents and compost on total and nitrification driving microbial communities at rhizosphere and soil level in a lettuce - *Fusarium oxysporum* f. sp. *lactucae* pathosystem. Per rev: **Journal of Applied Microbiology**, doi: 10.1111/jam.14153
- Bertora C., **Cucu M.A.**, Gorra R., Lerda C., Peyron M., Bardi L., Sacco D., Said-Pullicino D., Celi L. 2018. Dissolved organic carbon cycling, methane emissions and related microbial populations in temperate rice paddies with contrasting straw and water management. Per rev: **Agriculture, Ecosystem and Environment Journal**, 265: 292-306
- Matic S., **Cucu M.A.**, Gullino M.L., Garibaldi A. 2018. Combined Effect of CO<sub>2</sub> and temperature on wheat powdery mildew development. Per rev: **The Plant Pathology Journal**, 1-11, <https://doi.org/10.5423/PPJ.OA.11.2017.0226>
- Cucu M.A.**, Marhan S., Said-Pullicino D., Celi L., Kandeler E., Rasche F. 2017. Resource driven community dynamics of NH<sub>4</sub><sup>+</sup> assimilating and N<sub>2</sub>O reducing archaea in a temperate paddy soil. Per rev: **Pedobiologia**, 62: 16-27
- Said-Pullicino D., **Cucu M. A.**, Sodano M., Celi L. 2014. Nitrogen immobilisation in paddy soils as affected by redox conditions and rice straw incorporation. Per rev: **Geoderma**, 228-229:44-53
- Cucu M.A.**, Said-Pullicino D., Maurino V., Romani M Celi L. 2014. Nitrogen availability in fertilized paddy soils as a function of redox conditions and rice straw in corporation. Per rev: **Biology and Fertility of Soils**, 50: 755-764
- Cucu M. A.**, Said-Pullicino D., Celi L., 2011. Influence of redox soil conditions and rice straw incorporation on nitrogen availability in temperate paddy soils. In: Abstracts of the VII Brazilian Congress on Irrigated Rice, 9-12 August 2011, Santa Catarina, Brazil, pp. 405-408 (**EXTENDED ABSTRACT**)
- Bianchet P., Said-Pullicino D., Celi L., Saviolo A., **Cucu M. A.**, Mosca P., Romani P., Sangoi L., 2011. Características agronomicas do arroz irrigado submetido a diferentes sistemas de manejo dos resíduos culturais com e sem fertilizacão nitrogenada. In: Abstracts of the VII Brazilian Congress on Irrigated Rice, 9-12 August 2011, Santa Catarina, Brazil, pp. 91-94. (**EXTENDED ABSTRACT**)

## Submitted / in preparation

Fanfarillo E., Angiolini C., Tordoni E., Bacaro G., Bazzato E., Castaldini M., **Cucu M.A.**, Grattacaso M., Loppi S., Marignani M., Mocali S., Muggia L., Salerni E., Maccherini S. Arable plant

communities as surrogates of crop rhizosphere microbiota. **Nature Communications, NCOMMS-23-09297** (submitted 3/03/2023)

Scicutella F., **Cucu M.A.**, Mannelli F., Pastorelli R., Daghighi M., Paoli P., Pazzagli L., Turini L., Mantino A., Luti S., Genovese M., Viti C., Buccioni A. Olive oil pomace as ingredient in a sustainable dairy cow feeding strategy: effect on productive performances, rumen microbiota and milk quality. **Animal - The international journal of animal biosciences, ANIMAL-22-20993R1** (submitted 9/02/2023)

**Cucu M.A., Gilardi G., Gullino M.L., Garibaldi A.** Influence of different soil types and of organic carbon sources on resident microbial communities at the end of an anaerobic soil disinfestation treatment against the soil – borne pathogen *Phytophthora capsici*. **Plant and Soil**

**Cucu M.A., Said-Pullicino D., Divotti F., Chierotti M., Celi L.** Biotic and abiotic processes driving the immobilisation and distribution of the applied N in fertilised paddy soils. **Soil Biology and Biochemistry**

**Cucu M.A., Gorra R., Said-Pullicino D., Sacco D., Celi L., Bardi L.** Different agricultural practices drive aerobic and anaerobic ammonia oxidisers niche segregation in a temperate paddy soil. **Soil Biology and Biochemistry**

**Cucu M.A., Gilardi G., Tabone G., Gullino M.L., Garibaldi A.** Effect of *Bacillus subtilis* and compost application on rhizosphere microbial communities in the *Fusarium oxysporum* f.sp. *lactucae* race 1 – lettuce pathosystem in a climate change scenario. **Applied Soil Ecology Journal**.

Bianchet P., Said-Pullicino D., **Cucu M.A.**, Celi L., Sacco D. Nitrogen fertiliser use efficiency in irrigated rice as affected by different straw managements. **Plant and Soil**

**Cucu M.A., Gorra R., Said-Pullicino D., Bertora C., Sacco D., Celi L., Bardi L.** Dynamics of methanogens and methanotrophs driven by soil management in temperate paddies. **Biology and Fertility of Soils Journal**

#### Invited speaker

- "N – key nutrient for rice culture", 18 December 2014, Confagricoltura, Novara, Italy (8 hours).
- "Molecular techniques for study of nitrification/denitrification processes under flooded conditions" - "Tecniche molecolari per lo studio dei processi di nitrificazione/denitrificazione in ambienti sommersi "(23 & 24 May 2014), Dept. of Agricultural, Forest and Food Sciences, Agricultural Chemistry and Pedology, University of Turin, Italy
- Biotic processes controlling N immobilisation and losses in temperate paddy fields (22 January 2013), University of Hohenheim, Institute of Plant Production and Agroecology in the Tropics and Subtropics, Plant Production Section
- Changes in diversity and functional gene abundances of microbial communities involved in N immobilisation and denitrification in a temperate paddy soil (13 January 2013), University of Hohenheim, Institute of Soil Science and Land Evaluation Soil Biology Section, Germany
- Biotic and abiotic processes of nitrogen immobilisation in temperate paddy soils (11 May 2012), university of Hohenheim, Institute of Plant Production and Agroecology in the Tropics and Subtropics, Plant Production Section
- Biotic and abiotic processes of nitrogen immobilisation in temperate paddy soils (18 April 2012), university of Hohenheim, Institute of Soil Science and Land Evaluation Soil Biology Section, Germany

#### Research products

1. Fanfarillo E., Angiolini C., Tordoni E., Bacaro G., Bazzato E., Castaldini M., **Cucu M.A.**, Grattacaso M., Loppi S., Marignani M., Mocali S., Muggia L., Salerni E., Maccherini S. Arable plant communities as surrogates of soil microbiota along a gradient of agricultural intensity; Project: Congruence among vascular plants and other taxa. Book of Abstracts, II Conference of Young Botanists – Bozen, 9-10 february 2023 (oral presentation), Code: 2\_T\_04.
2. Casagli A., Pastorelli R., Becagli C., **Cucu A.**, Castaldini M., Lagomarsino A., (2022). Impatto di diverse tecniche gestionali del suolo sulla produzione potenziale di gas serra e sul microbioma coinvolto. Book of Abstracts, IX Convegno Nazionale di Viticoltura – Conegliano (TV) 13-15 giugno 2022 (poster presentation), pp.112.
3. **Cucu M.A.**, Fabiani A., Mocali S., (2021). EFFECTS OF GREEN GRAPES SOIL MANAGEMENT STRATEGIES ON SOIL MICROBIAL BIODIVERSITY IN THE VINEYARD – contribution in "Operational Handbook for vine nurserymen and wine growers" (ITA-ENG) under Programme for Environment and Climate Action - LIFE 2014-2020, pp.77-79.
4. Mannelli F., Daghighi M., Pastorelli R., Viti C., **Cucu M.A.**, Turini L., Scicutella F., Buccioni A., (2021). Milk nutritional quality and rumen microbial community of Holstein-Friesian cows fed a diet supplemented with olive oil pomace. Book of Abstracts, ASPA 24th Congress of the Animal Science and Production Association – Padova 21-24 september 2021 (oral presentation), pp.71.
5. Gilardi G., **Cucu M.A.**, Pugliese M., Gullino M.L., Garibaldi A., (2020). Effect of different organic



- amendments on lettuce Fusarium wilt and on soilborne microorganisms. *Acta Hort.* 1270. ISHS 2020. DOI 10.17660/ActaHortic.2020.1270.12, Proc. IX International Symposium on Soil and Substrate Disinfestation, Eds.: A. Gamliel et al.
6. Gullino M.L., **Cucu M.A.**, Gilardi G., Pugliese M., Garibaldi A., (2019). Effect of composts and BCAs on lettuce fusarium wilt and on microbial communities. Book of Abstracts, XXV SIPaV Congress, Milan (Italy) 16-18 September 2019 (poster presentation).
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Mother tongue: Romanian

- English: understanding, reading (very good), speaking, writing (very good)
- Italian: understanding, reading (very good), speaking, writing (good)
- French: understanding, reading (good), speaking, writing (medium)

#### Technical skills and competences

Soil Science, Molecular Biology, Microbial Ecology, Microbiology, Soil Microbiology

“Omics” approaches to study plant-microbe interactions

Soil sampling, molecular biology, microbiology and biochemistry analysis

- Next-Generation Sequencing (NGS) and General molecular biology techniques: nucleic acids isolation (DNA, RNA extraction), RNA and DNA microarrays, cloning - plasmid modifications, qPCR standards development, Real - Time PCR, RT-qPCR, cDNA library construction, PCR and all related techniques,  $^{15}\text{N}$ -DNA Stable Isotope Probing for tracing uptake of nutrients in biogeochemical cycling by microorganisms, fingerprinting technique: Terminal Fragment Length Polymorphism (TRFLP), Denaturing Gradient Gel Electrophoresis (DGGE), RFLP primer design technique;
- Chemical, biochemical and enzymatic analysis: inorganic N forms determination (colorimetric and diffusion methods), soil organic matter fractionation, mineral XRD characterization (X-ray Diffraction) method, use of stable isotopes ( $^{15}\text{N}$ ,  $^{13}\text{C}$ ), use of Vario TOC, Elementar for DOC and total N determination, use of isotope ratio mass spectrometry (Delta Plus XP, Thermo Electron); high performance liquid chromatography-mass spectrometry HPLC-MS; gas chromatography GS-MS, spectrophotometry, scanning electron microscope (SEM); ATP determination, microbial biomass determination, enzymatic essays, BIOLOG, ELISA, protein extraction, mono-dimensional and two-dimensional gel electrophoresis (proteomic approach), western blot, antioxidant enzyme activity assays, preservation techniques;

- Basic Microbiology Techniques: Culturing and Aseptic Techniques; issues culture; specific microorganism isolation, culture, enumeration; Biofilm formation technique; Pathogens Identification.

Experienced in the usage of: MS Office (Excel, Word, Power Point), Adobe, Sigma Plot, R, SPSS, SASS, Adobe Photoshop, BLAST (Basic Local Alignment Search Tool), QIIME2 pipeline

## Additional information – Research activities

Currently, the research activity of Dr. Cucu is focalized on the study of light-pathogen interaction with in vitro and in vivo models as follows: (i) definition, cultivation and study of in vitro bacterial models in planktonic and biofilm form, in the absence and in the presence of interaction with external visible light; examples of strains: *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* (ii) analysis of the optical characteristics of the produced models (iii) study of the results of photokilling experiments with microbiological techniques (e.g. CFU count), by varying the light dose and the concentration of possible photo-sensitizing substances (e.g. 5-ALA) or "dose enhancers" (e.g. KI).

### Previous research accomplishments

Starting with the PhD thesis in soil science and continuing as Post Doc Research assistant for 6 years at the Agricultural Microbiology and Agricultural Chemistry and Pedology, University of Turin, CREA - Turin, and Hohenheim University, Stuttgart, Germany, Dr. Cucu's research interest mainly developed around Nitrogen (N) cycle and the interaction with Carbon (C) cycle in terrestrial ecosystems and soil organic matter turnover, with special attention on biochemical processes mediated by soil microbial communities, through the usage of stable isotopes methodologies, in combination with organic matter fractionation techniques and molecular analyses. The project has brought together microbial with soil biogeochemistry, mineralogy, agronomy, and environmental analytical chemistry, and provided process-based, fundamental research into the magnitude and mechanisms controlling N and C biogeochemical cycling in paddy soils. The interdisciplinary approach enhance the knowledge on soil processes and connections with microbial control. The aim is to understand relationships between the ecology of the microbial communities, the biogeochemical processes they perform and the corresponding ecosystem functions.

In the next 3.5 years as Post Doc Research assistant at AGROINNOVA and the Department of Plant Pathology, University of Turin, the activity research of Dr. Cucu was focused on the effect of biocontrol agents (BCA) on the total microbial biomass in rhizosphere and soil in general and on the beneficial microorganisms, as well on the pathogens. By using a DNA based – characterization approach (mainly qPCR and RT – PCR) Dr. Cucu studied the extension of this effect and the interactions with the plant and the plant health status and the general soil suppression considering also the climate change scenario and the abiotic stress (by using phytotrons). Plant pathogens need to be managed in order to maintain high quality, safety and extend shelf – life of products. There is considerable interest in non chemical methods for disease management with more emphasis given to crop and soil health instead of disease control. Therefore, the rhizosphere beneficial microorganisms might be correlated with microbial diversity and enzyme activities, playing key roles in suppressing soil borne plant diseases by the mean of general soil suppression. General suppression is related to the competition for resources and antagonism between total soil microbial biomass, rhizosphere beneficial microorganisms and pathogens.

Later on, in the following 15 months as Fixed Term Researcher as CREA – AA, Florence, Dr. Cucu's research activity was mainly concentrated on the characterization of microbial diversity in vineyards in a long field experiment. The agriculture in general and the viticulture in particular reduce the soil microbial biomass as the result of using destructing agricultural soil practices. The main goal of the Green Grapes Project was to improve the sustainability of vineyard management. In this regard, different soil management strategies were used as well as various type of products to support plant protection as for example the **mycorrhizal fungi**: *Glomus intraradices* and *Glomus mosseae* to facilitate the absorption of water and nutrients by the root system which strengthen the plant. The mycorrhizae occupy the rhizosphere and promote the development of the root system. This allows rapid and energetic growth of the crops, a support of the development of the plant root system and influence on contrasting pathogenic fungi, as well. The fungal population establishes a symbiotic relationship with the root system of the plant, which improves the

absorption of nutrients and resistance to fungal pathogens present in the soil. By using soil microbiome analysis (Next Generation Sequencing - Myseq Illumina Sequencing method and Quantitative Insights Into Microbial Ecology (QIIME2) pipeline followed by statistical analysis) it was possible to study the long term effect of the considered agricultural practices on soil microbial populations in their complexity and especially on interactions between them and establishing correlations with the health plant status.

Prior to her PhD thesis, Dr. Cucu worked for 10 months at the Department of Plant Biology of the University of Turin, performing a molecular biology training in the framework of the European project INTEGRAL as Marie Curie research assistant. Dr. Cucu performed researches on the **arbuscular mycorrhizal symbiosis system**, focusing on the expression analysis of *Lotus japonicus* genes involved in the process of formation of arbuscular mycorrhizae. Using the molecular approach she learnt the following techniques: preparation of RNAi constructs, cultivation and handling of *E. coli*, Polymerase Chain Reaction (PCR), Agarose gel electrophoresis, PCR product cloning, preparation of chemical competent *E.coli* cells, transformation of *E.coli*, plasmid isolation, DNA restriction and ligation, purification of DNA fragments derived from PCR or plasmid restriction. She collaborated in settling up a time course experiment for mycorrhization of *Lotus japonicus* and *Hordeum vulgare* acquiring the following technical skills: surface sterilisation of *Lotus japonicus* seeds, collection and surface sterilisation of *Gigaspora margarita* spores, assembling of *Lotus/Gigaspora* "sandwiches" (Magenta vessel method), pot-cultures of *Hordeum vulgare* with *Glomus mosseae*, roots staining and microscope analyses.

During the Master programme "Plant Protection" from University "Al. I. Cuza", Iasi, Romania Dr.Cucu followed as ERASMUS student for one year the classes and labs at the Plant Biology Department of Turin University, her study being concentrated on plant symbiosis, their ecological meaning and their potential in sustainable agriculture and in the processes of environmental remediation. Her project was specifically in the area the mechanisms of **cellular interaction between plants and mycorrhizal fungi and the mechanisms of metal tolerance**, specifically aspect of the response to heavy metal stress by mycorrhizal fungi, with the thesis entitled: "Biochemical aspects of the *Oidiodendron maius* mycelium interactions with metals Cr and Ni in mycorrhizal ericoid associations from the serpentinitic soils of Natural Park Mont Avic, Italy". The techniques that Dr. Cucu managed to use in this period ranged from microbiological techniques (preparation of cultural media for in vitro inocula of fungi, fungi inocula in sterile conditions) to biochemical techniques (proteins extraction, mono-dimensional and two-dimensional gel electrophoresis, gel staining, Western blot, antioxidant enzymes activity assays).

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