VERBALE DEL COLLEGIO DEI DOCENTI DEL DOTTORATO DI RICERCA IN *SCIENZE DELLE PRODUZIONI VEGETALI E ANIMALI (XXXVII CICLO)*
RIUNIONE DEL 01.07.2022

Il giorno 01.07.2022, alle ore 9.00, viene aperta la riunione del Collegio dei Docenti del Corso di *Dottorato di Ricerca in Scienze delle Produzioni Vegetali e Animali (XXXVII ciclo)*, convocata d'urgenza con mail del 28.06.2022, con i seguenti punti all'OdG:

1. Comunicazioni
2. Nomina commissione e data di esame finale dei dottorandi Giulio METELLI, Marwa MOUROU, Riccardo PAGLIARELLO (XXXIV ciclo)
3. Varie ed eventuali

La riunione viene svolta per via telematica (via posta elettronica).
Sono presenti i seguenti componenti del Collegio dei Docenti: Prof.ssa Stefania ASTOLFI, Prof. Giorgio Mariano BALESTRA, Prof. Umberto BERNABUCCI, Prof.ssa Roberta BERNINI, Prof. Lorenzo BOCCIA, Prof. Enio CAMPIGLIA, Prof.ssa Carla CARUSO, Prof.ssa Mariateresa CARDARELLI, Prof. Raffaele CASA, Prof. Valerio CRISTOFORI, Prof. Giuseppe COLLA, Prof.ssa Adalgisa GUGLIELMINO, Prof. Nicola LACETERA, Prof.ssa Katia LIBURDI, Prof. Roberto MANCINELLI, Prof.ssa Stefania MASCI, Prof. Maurizio MICHELI, Prof. Rosario MULEO, Prof.ssa Mariella NOCENZI, Prof.ssa Maria Nicolina RIPA, Prof. Francesco ROSSINI, Prof. Roberto RUGGERI, Prof. Luca SANTI, Prof. Daniel Valentin SAVATIN, Prof. Francesco SESTILI, Prof.ssa Anna Maria TIMPERIO, Prof. Andrea VITALI, Dott. Alberto BATTISTELLI, Dott. Eugenio BENVENUTO, Dott. Gianluca BURCHI, Dott.ssa Anna Maria D'ONGHIA, Dott. Angelo SANTINO, Prof. Eduardo Gabriel VIRLA, Dott.ssa Chiara VOLPI.
Sono assenti: Prof. Stefano SPERANZA, Dott. Aldo CERIOTTI, Dott.ssa Chiara FRAZZOLI, Prof. Thierry GIARDINA.

Assume la funzione di Presidente la Prof.ssa Roberta BERNINI - Coordinatore del Collegio dei Docenti del Dottorato - e di Segretario verbalizzante il Prof. Francesco SESTILI.

1. Comunicazioni
Il Presidente comunica che l'Agenzia per la Coesione Territoriale ha emanato il bando per la concessione di risorse destinate al finanziamento, da parte dei Comuni presenti nelle aree interne, anche in forma associata, di borse di studio per "Dottorati Comunali" del XXXVIII ciclo, AA 2022/23. Secondo le indicazioni dell'Ufficio post-lauream, la domanda di partecipazione dovrà essere trasmessa, dai Comuni Capofila delle aggregazioni, a partire dalle ore 10.00 del 1° luglio 2022 all'indirizzo PEC dottorati.comunali@pec.agenziacoesione.gov.it entro le ore 12.00 del 15 luglio 2022. Il bando e i relativi allegati sono disponibili all'indirizzo https://www.agenziacoesione.gov.it/opportunita-e-bandi/bandi-per-dottorati

2. Nomina commissione e data di esame finale dei dottorandi Giulio METELLI, Marwa MOUROU, Riccardo PAGLIARELLO
Il Presidente rende noto ai componenti del Collegio dei Docenti che le tesi dei dottorandi Giulio METELLI, Marwa MOUROU, Riccardo PAGLIARELLO (XXXIV ciclo) sono state valutate positivamente dai revisori esterni. In allegato sono riportati le rispettive schede di valutazione.

Il Collegio dei Docenti si congratula con i dottorandi per le valutazioni conseguite, sulla base delle quali vengono ammessi all'esame finale. Di seguito, propone la Commissione, la data e la modalità di svolgimento di esame.

Membri effettivi

- Elena DI MATTIA, Ricercatore confermato - Università degli Studi della Tuscia
  Email: dimattia@unitus.it
- Salvatore DAVINO, Professore Associato - Università degli Studi di Palermo
  Email: salvatore.davino@unipa.it
- Antonia CARLUCCI, Professore Associato - Università degli Studi di Foggia
  Email: antonia.carlucci@unifg.it

Membri supplenti

- Francesco CANGANELLA, Professore Ordinario - Università degli Studi della Tuscia
  Email: salvatore.davino@unipa.it
- Laura MUGNAI, Professore Ordinario - Università degli Studi di Firenze
  Email: laura.mugnai@unifi.it

Data e ora: 26 luglio 2022, ore 10.00.
Modalità di svolgimento: telematica.

3. Varie ed eventuali
Nulla da discutere.

Il Collegio dei Docenti approva tutti i punti all'OdG e il presente verbale.

La riunione viene chiusa il 01.07.2022 alle ore 14.00.

Il Segretario verbalizzante
Prof. Francesco SESTILI

Il Presidente
Prof.ssa Roberta BERNINI

PhD Program in Plant and Animal Science, University of Tuscia, Viterbo (Italy)
Coordinator: Prof. Roberta BERNINI

Reviewer report (template)
N.B. The following template should be intended as a flexible model. The actual report may be adapted by the reviewer according to his/her needs.

Title of the thesis: GreenCube: on-ground space environment simulation effects on Lepidium sativum L. microgreens. A multidisciplinary approach to study the effects of multiple abiotic stress
PhD student: Giulio Metelli
Reviewer (surname, name and affiliation): Stefania Pasqualini – Dip.Chimica, Biologia e Biotecnologie - Università degli Studi di Perugia

Scientific quality	**Excellent**	**Good**	**Fair**	**Poor**
Originality of the research	X			
Suitability of the title with respect to the content	X			
Efficacy of the abstract		X		
Clarity of the aims	X			
Exhaustiveness of the introduction/state of art	X			
Suitability of the methodology	X			
Description of the experimental procedure		X		
Interpretation of the results		X		
Appropriateness of the discussion		X		
Completeness of references	X			
Overall evaluation	X			

General comments and remarks:
The research activity of Dr Giulio Metelli focused on the Greencube project, funded by the Italian Space Agency, aimed at studying the effect of various abiotic stresses on the growth and development of plants, in particular *Lepidium sativum* plants, placed inside a Cubesat type satellite, using innovative technologies to simulate on the ground the conditions of growth in a space environment, using in an integrated way non-destructive diagnostic techniques and metabolomic analysis for the study of physiological responses of plants. The rationale of the work emerges clearly and the methods employed appear correct. *Therefore, I can immediately express an overall positive judgement, and I can approve it for submission to the examining Commettee*.

The thesis is accepted:

- ***In the present form***
- ***X After minor revisions***
  Lack information on how the annotation/peak identification of metabolites by both targeted and untargeted analyses has been performed.
- ***After major revisions***

With major revisions, is it requested a revised version after 6 months?

- ***YES***
- ***NO***

Date, Perugia 11/05/2022 Signature Stefania Pasqualini

PhD Program in Plant and Animal Science, University of Tuscia, Viterbo (Italy)

Coordinator: Prof. Roberta BERNINI

Reviewer report (template)

N.B. The following template should be intended as a flexible model. The actual report may be adapted by the reviewer according to his/her needs.

Title of the thesis: GreenCube: on-ground space environment simulation effects on *Lepidium sativum* L. microgreens. A multidisciplinary approach to study the effects of multiple abiotic stress

PhD student: Giulio Metelli

Reviewer (surname, name and affiliation): Ferrante Antonio, Department of Agricultural and Environmental Science, University of Milano

Scientific quality	Excellent	Good	Fair	Poor
Originality of the research	x			
Suitability of the title with respect to the content	x			
Efficacy of the abstract		x		
Clarity of the aims		X		
Exhaustiveness of the introduction/state of art		X		
Suitability of the methodology		X		
Description of the experimental procedure		X		
Interpretation of the results		X		
Appropriateness of the discussion		X		
Completeness of references		X		
Overall evaluation		*x*		

General comments and remarks:

The thesis focuses on an original and innovative research related to the indoor cultivar oriented for space cultivation with growth chamber equipped for simulation the space environment. The effect of pressure (hypobaric), full spectrum LEDs lighting, low chronic g radiations exposure represented the experimental conditions. The plant used as model system was *Lepidium sativum* L. Results were clearly described and appropriate elaboration and analyses were carried out. Discussion is appropriate and adequate literature have been considered for the critical explanation of data reported.

However, there are some minor changes that should be carried out before public defence:

-use the full name of acronym in the text when it is used for the first time;

-citations in the text should be always reported in the same format, I would avoid the name of the initial of the names, just the surname and for long list of authors just the surname of the first author and et al.,

-The scientific name should be in italics;

-decimal of the numbers should be highlight as dots and not commas.

Please revise the thesis most of comments are reported in the text.

After this changes I will recommend the public defence of the thesis.

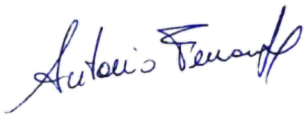
The thesis is accepted:

- ☐ *In the present form*
- ☒ *After minor revisions*
- ☐ *After major revisions*

With major revisions, is it requested a revised version after 6 months?

- ☐ *YES*
- ☐ *NO*

Date 09/06/2022 Signature



PhD Program in Plant and Animal Science, University of Tuscia, Viterbo (Italy)

Coordinator: Prof. Roberta BERNINI

Title of the thesis: **Eco-sustainable strategies to control Xylella fastidiosa subsp. pauca De Donno Strain by novel biological control agents: screening and mode of action in Apulian olive cultivars and Oleander plants**

PhD student: **Dr. Marwa Mourou**

Reviewer: LOPS Francesco - Department of Agriculture, Food, Natural Resources, and Engineering (DAFNE)- University of Foggia

Scientific quality	Excellent	Good	Fair	Poor
Originality of the research	X			
Suitability of the title with respect to the content	X			
Efficacy of the abstract	X			
Clarity of the aims	X			
Exhaustiveness of the introduction/state of art		X		
Suitability of the methodology	X			
Description of the experimental procedure		X		
Interpretation of the results	X			
Appropriateness of the discussion		X		
Completeness of references	X			
Overall evaluation	X			

The thesis is accepted:

- ☒ *In the present form*
- ☐ *After minor revisions*
- ☐ *After major revisions*

Date 05/31/2022

Signature

PhD Program in Plant and Animal Science, University of Tuscia, Viterbo (Italy)

Coordinator: Prof. Roberta BERNINI

Title of the thesis: Eco-sustainable strategies to control *Xylella fastidiosa* subsp. *pauca* De Donno Strain by novel biological control agents: screening and mode of action in Apulian olive cultivars and Oleander plants.

PhD student: Dr. Marwa Mourou

Reviewer (surname, name and affiliation): Maria Saponari, Istituto per la Protezione Sostenibile delle Piante, CNR, Bari

Scientific quality	Excellent	Good	Fair	Poor
Originality of the research		x		
Suitability of the title with respect to the content		x		
Efficacy of the abstract		x		
Clarity of the aims		x		
Exhaustiveness of the introduction/state of art	x			
Suitability of the methodology		x		
Description of the experimental procedure		x		
Interpretation of the results		x		
Appropriateness of the discussion		x		
Completeness of references	x			
Overall evaluation		*X*		

General comments and remarks: The experimental work performed by Dr. Marwa Mourou fully cover all the aspects related to the selection and evaluation of the efficacy of natural antagonist(s) against a detrimental plant pathogen, like *Xylella fastidiosa*. The characterization of the cultivable microorganisms included different integrated approaches, including the characterization of the metabolite(s) produced by those unraveling interesting antagonistic activities (at least in vitro). The background description and the literature search has been excellently developed. As well as the description of the methodologies, with the only exception of chapter IV, where several details on the inoculation and sampling to assess the endophytic colonization are missing.

In conclusion, I would suggest:

- a language revision, in particular of the abstract and discussion. Some inputs for language revision are included on the original document and saved in the link provided to the reviewers.

- chapter IV: provide some more details about the sampling distance from the inoculation points, how the material was splitted for molecular tests and isolation, period of the inoculation, the size of this 1-year old plant? In terms of n. of shoots and perhaps distribution of the 10 inoculum points.
- discussion should be a little improved considering the overall data, in several points it refers to the need of future investigations, it is redundantly repeated this concept, may be try to condense the discussion and to make reference to the results of chapter IV.

The thesis is accepted:

- ☐ *In the present form*
- ☐ *X After minor revisions*
- ☐ *After major revisions*

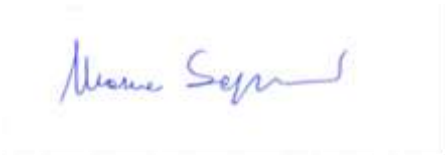
With major revisions, is it requested a revised version after 6 months?

- ☐ *YES*
- ☐ *NO*

Date, 10/6/2022

Signature

Dr. Maria Saponari



PhD Program in Plant and Animal Science, University of Tuscia, Viterbo (Italy)

Coordinator: Prof. Roberta BERNINI

Reviewer report (template)

N.B. The following template should be intended as a flexible model. The actual report may be adapted by the reviewer according to his/her needs.

Title of the thesis: Biofortified tomato plants as a test bed for space agriculture

PhD student: Riccardo Pagliarello

Reviewer (surname, name and affiliation):

Guzzo Flavia, University of Verona

Scientific quality	Excellent	Good	Fair	Poor
Originality of the research	X			
Suitability of the title with respect to the content	X			
Efficacy of the abstract		X		
Clarity of the aims	X			
Exhaustiveness of the introduction/state of art	X			
Suitability of the methodology		X		
Description of the experimental procedure		X		
Interpretation of the results	X			
Appropriateness of the discussion	X			
Completeness of references	X			
Overall evaluation	X			

General comments and remarks:

This thesis reports a very deep and complete analysis of micro-TOM plants overexpressing the R2R3-MYB transcription factor PhAN4 from Petunia hybrida and overaccumulating anthocyanins and other phenylpropanoids, also in environmental situations that mimic some possible challenges of space missions. The experiments are well designed, realized and discussed. The thesis is also very well written.

The thesis is accepted:

- [X] X *In the present form*
- [ ] *After minor revisions*
- [ ] *After major revisions*

With major revisions, is it requested a revised version after 6 months?

- ☐ *YES*
- ☐ *NO*

Date 1st June 2022

Signature

PhD Program in Plant and Animal Science, University of Tuscia, Viterbo (Italy)

Coordinator: Prof. Roberta BERNINI

Reviewer report

Title of the thesis: Biofortified tomato plants as a test bed for space agriculture

PhD student: Riccardo Pagliarello

Reviewer (surname, name and affiliation):

Caretto Sofia Pia Anna – CNR, Istituto di Scienze delle Produzioni Alimentari Lecce

Scientific quality	Excellent	Good	Fair	Poor
Originality of the research	X			
Suitability of the title with respect to the content		X		
Efficacy of the abstract	X			
Clarity of the aims	X			
Exhaustiveness of the introduction/state of art	X			
Suitability of the methodology		X		
Description of the experimental procedure	X			
Interpretation of the results	X			
Appropriateness of the discussion		X		
Completeness of references		X		
Overall evaluation	X			

General comments and remarks:

The thesis reports the work carried out by the candidate at Biotechnology Laboratory of ENEA Casaccia Research Center aimed at obtaining and characterizing engineered tomato plants to be cultivated as ideal fresh space-food in view of long term space missions. In particular, the ectopic expression of *PhAN4* gene from *Petunia hybrida* in tomato plants of the dwarf cultivar MicroTom made it possible to obtain biofortified plants with enhanced accumulation of healthful compounds, such as flavonoids, including anthocyanins. Such biofortification helped improving tomato fruit nutritional value, as well as enhancing plant defense against ionizing radiation occurring in space environments.

In the first part of the work, a model system consisting of MicroTom hairy root cultures, constitutively expressing *PhAN4* gene, was in-depth investigated at transcriptomic and metabolomic levels to assess the role of *PhAN4* gene in activating the anthocyanin biosynthetic pathway and other pathways involved in plant stress response; the ability to counteract oxidative stress was also assessed after gamma rays application. In the second part, transgenic MicroTom plants, AN4-M (homozygous) and AN4-P2 (hemizygous) were obtained using *Agrobacterium tumefaciens* and well characterized either genetically or phenotipically. Indeed, anthocyanin accumulation and increased antioxidant capacity were detected in engineered fruits, which also

showed more tolerance to gamma rays. The ability to face ionizing radiation at increasing doses was investigated in transgenic MicroTom seeds and plants at different developmental stages showing dose- and stage-dependent responses. Seeds were generally more tolerant than plants, which nevertheless were tolerant to low doses, producing fruits and viable seeds. Offspring of irradiated parental plants resulted affected by ionizing radiation exposure, but inheritance of parental mutations should be excluded.
Overall, AN4-M was identified as the most promising genotype for the aim of this work, which can be considered an original contribution to the subject dealing with space-agriculture.
The thesis is of high quality and generally well written. Introduction clearly reports the state of art of the scientific problems and topics that are then covered and faced through the experimental work. Experimental procedures are well described and results clearly presented also including some helpful comments. However, discussion in the present form appears excessively long and could be better organized. It could be ameliorated by preferable focusing on comments related to the obtained results, reducing speculation and organizing the text in paragraphs: the present three paragraphs do not easily guide the reader towards conclusions. Also the number of references could be reduced, mostly when cited supporting the same information.

The thesis is accepted:

- ☐ *In the present form*

XAfter minor revisions

- ☐ *After major revisions*

With major revisions, is it requested a revised version after 6 months?

- ☐ *YES*
- ☐ *NO*

Date

31/05/2022

Signature