



**Dottorato di Ricerca in Scienze delle Produzioni Vegetali e Animali**

**PhD Programme in Plant and Animal Science**

**Codice del Corso di Dottorato/PhD code: DOT1335834**

**Coordinatore/Coordinator: Prof. Roberta BERNINI**

**Scheda delle attività svolte/Form activities carried out**

**Informazioni generali/General information**

Ciclo/Cycle 36 CICLO

Dottorando/PhD student MENGOLI STEFANO

Posizione/Position

Con borsa di studio/With scholarship

Senza borsa di studio/Without scholarship

Riservata a dipendenti di enti di ricerca/Reserved for research center employees

Dottorato industriale/Industrial PhD

Altra tipologia/Other typology

Tutor/Supervisor GIUSEPPE COLLA

Affiliazione/Affiliation DAFNE VITERBO

Co-tutor GIANLUCA BURCHI

Affiliazione/Affiliation CREA-VIV PESCIA (PT)

**Attività di ricerca/Research activity**

Sede prevalente dell'attività di ricerca/Main place of research CREA-VIV PESCIA (PT), ALSIA METAPONTO (MT)

Breve descrizione dell'attività di ricerca/Short description of the research activity  
(Max 5000 caratteri, inclusi gli spazi/Max 5000 characters, included spaces)

The third year's activity took the form of completing the measurement activities on the species under cultivation at the experimental areas (Vertical Garden, Hanging Green Surfaces) designed and managed at the CREA-ViV Center in Pescia; a term that was achieved with the execution of the destructive analyses aimed at surveying the leaf area and the biomass data for the species under investigation. This activity was completed in October 2023 being the planting phase of the experimental sites started in October 2021: the data analysis phase is still in progress and will lead to the definition of guidelines for the botanical design of vertical garden and green roof plants. On the data achieved with the research operated in Tuscany, integration will also be made with the data provided by the other ongoing activity, activated by the agreement between the DAFNE of Viterbo (UniTuscia) and the DICEM of Matera (UniBasilicata) signed in the year 2022: Complementary research activity based at the Alsia Center in Metaponto, where the 22 Theses (Species) subjected to 3 Treatments (Well Irrigated, Stress Idrico Micorr, Stress Idrico) and for 5 replications for a total of 330 plants were installed in April 2023.

The research work in Basilicata was aimed at completing the investigation of species considered usable for architectural greenery through observation of the bibliography and of the utilization carried out in local plants, and the research was achieved by screening of water stress and evaluations of biometric data on 22 species subjected, as was the case for the work carried out in Pescia, to biostimulation cycles. In total, the research activity dealt with 40 species, diversified as biological form (ecological) and as



woody/suffruticose texture. After the last step of biometric measurement on the plants, which is scheduled at Alsia in Metaponto for January 2024, leaf area analysis and biomass data will follow using, unlike in Pescia, a non-destructive method. The method employed involves the use of the plant phenomics research platform provided at the center: through the platform, morphometric parameters such as plant architecture (length and width of internodes and leaves, leaf angle, compactness, etc.), colorimetric parameters such as leaf coloration (chlorophyll content), in relation to applied water stresses and/or use of biostimulants, can be detected in an automated manner and through computer pipelines of image analysis.

Since the purpose of the research is to develop guidelines for the construction of architectural green plants and to instruct a methodology for the use of territorial species in the botanical design of these plants, it was possible to include in the research project the creation of an experimental vegetation wall adopting the species under investigation at Alsia: this wall is currently being set up (completion of work by December 2023) and will be set up on the Matera public housing building, with installation of 9 of the theses (species) under analysis at the Alsia center: the wall will be equipped with probes for evaluating thermal efficiency, and vegetation cover data will be linked to cooling values measured on the wall faces. The construction of the guidelines also includes a phase of verification of the applicability of the parameters introduced by the research: the intervention of the construction of 13 vertical walls in Bolzano, with the starting condition that required the use of species from the area, and considering that the construction site is in progress and foresees the planting phase in winter 2024, will allow to verify the functionality of the parameters provided by the research and their modularity of use in both preliminary and final design phases of green plants and in the testing/verification of the proper functioning of architectural green plants.

The application of the guidelines is intended in having a botanical design of architectural green plants more connected to local floristics and in achieving durability resulting from increased resistance to long periods of drought.

<p>Publicazioni scientifiche/Scientific publications (Indicare tutte le informazioni bibliografiche dei lavori pubblicati e sottomessi/Indicate all references of published and submitted papers)</p>	
<p>Comunicazioni a congressi/Conferences communications (Specificare se comunicazioni poster o comunicazioni orali/Specify if poster or oral communications)</p>	<p>1. Poster SOI XIV GIORNATE TECNICHE TORINO GIUGNO 2023 _ Construction Criteria and Methodologies to Increase Environmental Performance in the Construction of Vertical Gardens, Green Roofs, and Other Architectural Green Solutions _ team <b>Stefano Mengoli</b> <sup>1)</sup> <b>Gianluca Burchi</b></p>



	<sup>2)</sup> <b>Giuseppe Colla</b> <sup>1)</sup>  1) <i>Dip. Scienze Agrarie e Forestali (DAFNE) – Università della Tuscia, Viterbo</i> 2) <i>CREA Centro Ricerca Orticoltura Florovivaismo, Via dei Fiori 8, 51017 Pescia (Pt)</i>	
Brevetti/Patents (Specificare/Specify)		
Altre tipologie di pubblicazioni/Other publications (Specificare/Specify)	<b>S. Mengoli</b> , Construction Criteria and Methodologies to Increase Environmental Performance in the Construction of Vertical Gardens, Green Roofs, and Other Architectural Green Solutions, <b>Acer Il verde Editoriale (Milano)</b> , Nr 1 / 2023, pag 8/8	
<b>Attività formative/Training activities</b> (Elencare tutte le principali attività svolte e, per ciascuna di esse, indicare i dati richiesti/List the main activities and for each specify of them the data)		
Frequenza corsi/Partecipation in courses	Titolo/Title	Località/Location
Partecipazione a seminari/ Participation in seminars	<i>Garden Design Master, Italian Design institute Milano,</i>	<i>Pistoia Nursery Campus, ore 56 (13-20/04/ 2023)</i>
	<i>Green Urbanism , Italian Design institute Milano,</i>	<i>On line, ore 32 (5/04/2023-01/06/2023)</i>
	<i>the resilient city, green infrastructure</i>	<i>Matera, unibasilicata, ore 3 (29/04/2023)</i>
	<i>Green infrastructure</i>	<i>Unisalento, ore 3 (10/05/2023)</i>



	<i>Construction Criteria and Methodologies to Increase Environmental Performance in the Construction of Vertical Gardens, Green Roofs, and Other Architectural Green Solutions</i>	CREA-VIV Pesca (Pt), 15/11/2023
Partecipazione a convegni, workshop, scuole/Partecipation in workshop, schools	RECAP_applications of green urbanism (rapporteur_ Analysis of the city's green system, green infrastructure for the city)  BRACCIA DI TERRA_(rapporteur_ the city rethought by the landscape architect)	Nursery Campus, Pistoia    Lecce
Stage in Italia e/o all'estero/Internship in Italy and/or abroad (Indicare la località e descrivere brevemente il tipo di attività svolta/Indicate the location and describe briefly the activity carried out)	Internship in Austrian and Italian Tyrol: water management and solutions for green roofs and vertical gardens	Politecnico of Innsbruck, Università di Trento, Università di Bolzano, Provincia di Bolzano (Castello di Trauttmansdorff)
Altre attività formative/Further educational activities (Indicare la località e descrivere brevemente il tipo di attività svolta/Indicate the location and describe briefly the activity carried out)	<i>Green space maintainer, (Tuscany Region)</i>	<i>Pistoia Nursery Campus</i>
<b>Attività di didattica integrativa/Teaching activity</b> (Elencare tutte le attività svolte e, per ognuna, indicare i dati richiesti/List all activities and specify for each of them the data)		
Attività di tutoraggio e didattico-integrative/Tutorship activities	Titolo/Title	Località/Location
Seminari in corsi di laurea/Seminars in master degrees (Indicare il titolo, la località, la data/Specify the title, the location and the date)	Research project (research grant) on the green system of the city of Matera and Melfi: study of SEA and ecological redevelopment works, agricultural park of the city of Melfi preliminary analysis	Matera
Data/Date 24/10/2023		



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Firma Dottorando/SignaturePhDstudent



*Stefano Mengoli*

Firma Tutor/Signature Supervisor

24/10/2023



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