



CALL FOR POSTDOCTORAL RESEARCHER

To be part of the

CLIMOLIVEMED PROJECT

Transdisciplinary Research towards Climate Change in Olive Culture

TERMS OF REFERENCE

I. Introduction

Agropolis Fondation¹, Fondazione Cariplo² extend their Partnership Agreement expressing the common objective of contributing to address sustainability of agriculture and food systems issues by collectively supporting the international scientific project **"Diversity of varieties and farming systems as an asset of Mediterranean oleiculture in a global change setting : ClimOliveMed"**.

Olive (*Olea europaea L.*, *Oleaceae*) is an iconic fruit tree species for human societies in the Mediterranean area. It is considered as a structural element of many Mediterranean agroecosystems and is currently a major global source of edible oil, whose demand is sharply increasing due to its high nutritional value. Nowadays, olive growing is still highly diversified since more than thirty varieties are cultivated in the Mediterranean Basin (MB hereafter). Olive orchards are characterized by a diversity of cropping systems, ranging from extensive and diversified agroecosystems to super-intensive. World olive oil production is estimated at 3 million t/year (~75% in European Union countries) and markets are highly diversified ranging from a mass market with standard products to niche markets for products with signs of quality and high value.

The ClimOliveMed project aims to increase understandings on biological, economic and social factors for enhanced resilience and sustainability of Mediterranean olive growing in face of climate changes and to open new public spaces for increased awareness and collaboration among actors to design and manage adaptation strategies. Two main pivotal research questions will be addressed: i) How the invaluable asset of the rich olive agrobiodiversity can serve as a risk-mitigation strategy to face climatic change? ii) How the diversity of cropping systems and markets can serve as a factor for enhanced resilience and sustainability of Mediterranean olive growing?

ClimOliveMed is structured into three work packages. The first and second ones correspond to disciplinary research lines, while the third is devoted to the collective action between academic and sector actors through workshops to share knowledge and perspectives and design sustainable olive tree production trajectories.

¹ *Agropolis Fondation* is a French foundation for scientific cooperation established in 2007 to promote and support high-level research and higher education (training-through-research) as well as to broaden international partnerships in agricultural sciences and sustainable development research. It supports a research network with scientists working on a continuum of multidisciplinary knowledge - from the study of genetics to agro-ecosystems to final use of agricultural products and interaction between agriculture and society; and with recognized expertise over numerous plant species from temperate, Mediterranean and tropical areas.

² *Fondazione Cariplo* is an Italian banking foundation (Law No. 461/98 and Legislative Decree No. 153/1999) whose mission is to advance social good and human development, supporting civil society organisations with direct initiatives or partnerships. Following the subsidiarity principle, the Foundation fosters social needs analysis and anticipation, supports innovative high-impact models, facilitates innovation as well as scientific communication and dissemination of research outcomes. Among others, the foundation supports projects in the agro-food sector with the final aim of contributing towards sustainable production and consumption systems, while improving quality and productivity, as well as safety of the final products.

Coordinated by the CIRAD³ (France), ClimOliveMed covers several scientific fields (agronomy, biology, ecophysiology, genomics, bioinformatics, economy, political sciences, ethnoecology), and will involve managers of olive genetic resources and professional actors, implying the participation of a large consortium including several French, Spanish (IOC (International Olive Council) and Moroccan academic and research partners.

Agropolis Fondation and Fondazione Cariplo would promote the training of Italian young scientists by supporting 2 positions to take part in the ClimOliveMed project and thus expand the partnership to Italy.

II. Objectives of the call

1) The objective of the call is to finance **two postdoctoral positions for young Italian researchers**, one in plant biology – *population genetics* – and the second one in social sciences – *ecology, geography* – to contribute scientifically to the ClimOliveMed project. The two young researchers selected will be recruited by **CIRAD** and hosted at the **Joint Research Unit AGAP** (<https://umr-agap.cirad.fr/en>), for a period of **24 months**.

A call is held for each position offered

- a) Position **1**: July to September 2022
- b) Position **2**: December 2022 to February 2023

III. thematic coverage of the Call

POSITION 1

The young researcher will be recruited to work on the first Workpackage (WP) of the project. Focusing on the diversity of olive varieties within the worldwide collection (Porquerolles and Marrakech), this first WP aims at identifying the most relevant and easy-to-measure phenotypic traits and genomic markers. The objective is to characterize local genetic resources with respect to chilling requirements on the one hand and drought tolerance on the other hand, in order to identify olive genotypes adapted to different facets of climate change. Three aspects of olive biology will be studied: i) biological processes of olive flowering linked to winter cold temperature, ii) phenotypic traits to provide a broad view as to how olive trees cope with drought, iii) genomics of local adaptation of wild olive and genomic association to phenotypic traits of cultivated olive.

Objectives and research subject: This postdoc position will focus on estimating the vulnerability of olive trees using two main approaches. First, using niche ecological modeling approaches the postdoctoral researcher will establish the putative range of cultivation and predict its change in the future climate conditions. To do this, he/she will benefit from occurrence data of the cultivated varieties all over the Mediterranean and from publicly available climate datasets. These occurrences together with their growing conditions will help to model the niche of the cultivated species and thus the prediction of the cultural range both under present and future conditions. Anticipated tools to be used in this section include machine learning or maximum likelihood based approaches that can model the suitable range of a species given its occurrence data. Data on wild stands from the western part of the Mediterranean where wild trees are expected to have evolved without cultivated introgression will be available to enable niche modeling of the wild compartment and comparison with the cultivated one. In a second part, the postdoctoral researcher will assess the genomic vulnerability (also referred to as "genetic offset") of the olive tree cultivated varieties. Using a whole genome sequencing dataset obtained from a reference set of 200 cultivated varieties, he/she will use machine learning approaches (for instance gradient forest; Bay *et al*, 2018; Rhoné *et al*, 2020) to model the relationships between current climate conditions and allelic composition turnouts. Then,

³CIRAD: founded in 1984 as a French public establishment, CIRAD (French Agricultural Research Centre for International Development) works with its partners to build knowledge and solutions and invent resilient farming systems for a more sustainable, inclusive world. It mobilizes science, innovation and training in order to achieve the Sustainable Development Goals. Its expertise supports the entire range of stakeholders, from producers to public policymakers, to foster biodiversity protection, agroecological transitions, food system sustainability, health (of plants, animals and ecosystems), sustainable development of rural territories, and their resilience to climate change. CIRAD works in some fifty countries on every continent, thanks to the expertise of its 1650 staff members, including 1140 scientists, backed by a global network of some 200 partners.

based on future climate projection, he/she will identify the regions of the cultural basin that are in greater threat regarding future climate conditions. As well as in the first part, a comprehensive genomic dataset will be generated for wild populations in the western Mediterranean (through a capture experiment in a Pool-seq design) in the frame of a PhD position. The postdoctoral researcher will be associated to the bio-informatic analysis of this dataset and will use it to assess the wild olive tree genomic vulnerability.

IV. Application process

A. Eligibility

To be eligible, the candidate must meet the following criteria:

- a) Only postdoctoral researcher with Italian nationality can apply.
- b) The candidate is less than 35 years old;
- c) The candidate has a PhD
- d) The candidate is supported by an Italian university or research center

One year of research experience (or more) would be a plus.

B. Job description

The application must be in line with the job description, in **appendix 1**.

Period of research contract: 24 months

Start date of the position: December 2022.

Remuneration: **€2,147 net per month** (€62,800 gross /year)

The candidate will benefit from the French Social Security system.

C. Application process

The call is opened **from 1st August 2022 until 30 September 2022, 11.59 PM**.

Only full applications will be evaluated. The information requested is:

- General information about the candidate
- One or two referees contact
- CV (curriculum vitae)
- Cover letter
- Support letter of an Italian University or research center

The application must be submitted onto the Agropolis Fondation's platform:

<https://agropolis.jotform.com/221932186908058>

D. Provisional Calendar

1 st August 2022	Opening of the Call for applications
30 September 2022, 11.59 PM	Deadline for the submission of applications <i>Late and/or incomplete submissions will not be considered.</i>
Mid-October 2022	Publication of results

V. Selection process

Agropolis Fondation will organize a specific committee for the candidate's selection. Experts panel from ClimOliveMed, Agropolis Fondation and Fondazione Cariplo representatives shall be mobilized for reviewing the eligible submissions received under this Call. Interviews will be organized for final selection.