



Decree of the Rector n. 860 of 13/09/2023
Competition for awarding 1 research grant at the University of Udine

DISCLAIMER:

The official and legally binding call for applications is in Italian only. This document cannot be used for legal purposes and is only meant to provide information in English on the call for applications (Decree of the Rector n. 860 of 13/09/2023). Please refer to the official call published on: <https://www.uniud.it/it/albo-ufficiale>

Any change and integration will be made available on the above mentioned web page. Therefore, no personal written communication regarding the examination date and/or competition results shall be provided to applicants.

Annex 1

Competition announcement for the assignment of 1 research grant at the University of Udine, entitled "Exploring the genomic variability of 'Candidatus Phytoplasma solani' and the molecular mechanisms underlying its pathogenicity in different hosts" SSD: AGR/12 (principal investigator, Marta Martini)

Research grant funded by the resources of the project PRIN 2022 - Prot. n. 2022FCZTAK

Art. 1

A selection procedure is hereby launched for the award of 1 research grant at the University of Udine, as identified in Attachment A which constitutes an integral part of the present announcement.

The research grant is linked to the research project and is subject and conditioned upon the relative funding.

The fellowship may be renewed, in compliance with Art. 22, Law No. 240 of 30 December 2010 (as in the text in force before the implementation of the Conversion Law of the D.L. 36/2022, L. 79/2022), Law No. 11 of 27 February 2015, and the current regulations of the University of Udine for awarding research grants, issued with the Rector's Decree No. 182 of 31 March 2021. The renewal is subject to the scientific coordinator's positive assessment of the researcher's activities, an adequate scientific rationale, and a corresponding financial covering.

The research fellowship does not give rise to any right with regards to accessing University posts.

Any personal communication to candidates related to this selection will be sent exclusively to the email address indicated when registering for the selection, as mentioned in Art. 5.

Art. 2

The research grant described in this competition announcement and the required qualifications to apply for the position are identified in Attachment A. The lack of the admission requirements leads to the automatic exclusion from the competition procedure.

Possession of a PhD or equivalent degree obtained abroad or, only for the interested areas, of a medical specialization accompanied by an adequate scientific production, constitutes a preferential qualification for awarding the research fellowship of this selection, if it has not been provided as a mandatory requirement.



For the only purpose of the admission to the competition, the Examining Board (Art. 7) shall assess the equivalence of the qualification obtained abroad, except for the evaluation of the medical specialization qualification to which Article 38 of the Legislative Decree 165/2001 and subsequent modifications and additions, and EU regulations on the matter, shall be applied.

The Examining Board will proceed to the evaluation of the qualification obtained abroad according to the documentation attached to the application form. The Examining Board may exclude the candidate if the submitted documentation does not provide sufficient information for the assessment. Therefore, applicants must enclose all the documentation in their possession relating to their qualification in order to provide the Examining Board with sufficient information for assessment.

Candidates holding a qualification issued by a **European Research Area country**, if successful, must submit, if not already attached to the application form one of the following options:

- Supplement Diploma in English issued by the competent University.
- CIMEA Certificate of comparability of the foreign qualification, issued by CIMEA (Information Centre on Academic Mobility and Equivalence) via the "diplome" service at <https://cimea.diplo-me.eu/udine/#/auth/login>

Candidates holding a qualification issued by a **non-European Research Area country**, if successful, must submit, if not already attached to the application form one of the following options:

- Declaration of the on-site value of the qualification and the certificate relating to the degree with examinations and grades. A certificate in a language other than Italian or English must be accompanied by an official translation into one of these languages (certified by the competent diplomatic-consular authority or certified by a court in Italy).
- CIMEA Certificate of comparability of the foreign qualification, issued by CIMEA (Information Centre on Academic Mobility and Equivalence) via the "diplome" service at <https://cimea.diplo-me.eu/udine/#/auth/login>

If the Supplement Diploma or the statement/attestation of comparability are not available when signing the contract, the applicant must demonstrate that he/she has requested the documentation and submit it as soon as possible.

Any exclusion from the selection procedure due to lack of eligibility requirements, absence of required documents, failure to sign the selection application or submission of the selection application in a manner different from what is provided for in this call for applications will be communicated to applicants exclusively at the email address indicated in the application form.

Art. 3

The research grant referred to in this call for applications cannot be awarded:

- a. to employees of Universities and the entities referred to in Article 22, section 1, of Italian Law no. 240 of 30 December 2010 (in the text prior to the reform introduced by Law no. 79 of 29 June 2022);
- b. to those who have already been awarded research grants pursuant to Italian Law no. 240 of 30 December 2010 (prior to the reform introduced by Law no. 79 of 29 June 2022) for the maximum period provided by law, even if not continuously, excluding the period in which the grant was used in conjunction with the doctorate, up to the legal term of the relative course;
- c. to those who have already benefited from research grants and fixed-term researcher contracts provided for, respectively, in Articles 22 and 24 of Italian Law no. 240 of 30 December 2010 (in the



text prior to the reform introduced by Law no. 79 of 29 June 2022), for a total of 12 years, even if not consecutive;

- d. to anyone who has a degree of kinship or affinity, up to and including the fourth degree, with:
- the Rector, the Director General or a member of the Board of Directors of the University of Udine;
 - the scientific supervisor or a professor/researcher belonging to the department or organisation hosting the research grant in question.

The research grant provided for in this call for applications cannot be combined:

- a) with scholarships of any kind, except for those granted by Italian or foreign institutions to supplement, by means of stays abroad, the fellow's training or research activities;
- b) with other research grants;
- c) with an employment relationship, even if part-time, without prejudice to the relevant provisions for employees of public administrations.

The grant awarded under this call for applications is also incompatible with simultaneous attendance at university degree courses, either Bachelor's degree or Master's degree courses, research Doctorates with scholarships and medical specializations, in Italy or abroad.

Art. 4

Applicants must enclose with their application, under penalty of exclusion, the following documents:

- a) their professional scientific CV, highlighting the candidate's aptitude for carrying out and implementing the research project (Attachment A);
- b) their identity card, their passport or any other identification document¹;
- c) (for candidates with a foreign qualification only) certification or self-certification of both the academic qualification required for the admission to the selection, and of the exams (with evaluation) took during the period of study abroad, and of any other document that can be useful to the evaluation of the degree by the Examining Board.

Applicants can attach to the application, publications and any other certification considered useful to demonstrate the qualification based on the research program (Attachment A) and to certify any research activity accomplished at public or private institutes (indicating the starting and ending date and the duration).

The documents and qualifications mentioned above must be submitted in Italian or English. Those that are not as requested will not be evaluated. Documents originally written in a language other than Italian or English must come with a translation in Italian or English, that the candidate will do on its own responsibility. The translation can be an abstract concerning the thesis.

Italian and Community candidates wishing to submit qualifications referring to conditions and facts attested by Public Administrations must proceed exclusively with self-certification.

Non-EU citizens legally residing in Italy may self-certify only data that can be verified or certified by Italian public bodies. They may also use declarations in lieu when provided for by an international convention between Italy and the declarant's country of origin.

Non-EU citizens not residing in Italy cannot self-certify.

Only the qualifications possessed by the candidate on the date the application form is submitted and submitted in accordance with the procedures set out in Article 5 will be assessed.

¹ Please be aware that the residence permit is not an identification document.



Failure to submit mandatory documents provided for in this article will constitute grounds for exclusion from the selection.

Art. 5

The submission of the applications for the present call starts on September 21, 2023 at 2:00 pm (Italian time) and ends on November 10, 2023 at 2:00 pm (Italian time).

The application to take part in the selection must be completed, under penalty of exclusion, using the appropriate online procedure, available at the link <https://pica.cineca.it/>. The procedure involves an applicant registration step, for those who do not already have an account, and then an application completion step.

Once completed, the online application must be signed in the manner described in the online procedure (manual signature with attached identity document or digital signature), under penalty of exclusion from selection. The application does not have to be signed if you access the above-mentioned online procedure using your SPID ID.

The qualifications referred to in Article 4 must be attached to the application in .pdf format. Individual .pdf files may not exceed 30MB.

The application for participation in the selection is automatically sent to the University of Udine with the definitive closing of the online procedure.

The University Administration:

- is not responsible if it is impossible to read the submitted documentation in electronic format due to damaged files;
- shall not accept or take into consideration qualifications or documents received in paper form or by any means other than what is specified in this article.

Reference to documents or publications already submitted in connection with other competitions is not allowed.

The Administration is not responsible for any missing document or communication because of inaccurate indication of residence and/or address submitted by the candidate during the application. Also, the Administration is not responsible if the candidate has not communicated changes in this information, or has communicated them too late. The Administration is also not responsible for any postal or telegraphic problems not attributable to the Administration itself.

Applicants are advised not to wait until the last few days before the closing date to submit their application. The University accepts no responsibility for any malfunctions due to technical problems and/or overloading of the communication line and/or application systems.

Art. 6

The selection procedure is held in accordance with the modality indicated in Attachment A.

The test will aim to assess the general preparation, experience and aptitude for research of the candidate. It will consist in the evaluation of the professional scientific curriculum, of the publications and qualifications presented, and of the interview, where foreseen.



Art. 7

The Examining board for the competition is identified in Attachment A of the present competition announcement, of which it is an integral part.

At its first meeting, the Examining board shall appoint its President and Secretary, and establish the criteria and methods for evaluating the qualifications and the interview, where foreseen.

The results of the qualifications assessment must be disclosed to applicants during the interview, where foreseen.

The Examining board can award a maximum of 100 points (one hundred out of one hundred) to the selection.

At the end of the evaluation procedure, the Examining board shall formulate the general merit list based on the overall score of each candidate, and draw up the minutes of the whole competition procedure.

Based on the ranking list, the assignment is awarded to candidates who have obtained a minimum overall score of 70/100 (seventy out of one hundred).

The Examining board's judgement is final.

The ranking list will be made public exclusively through publication on the University's official website.

Applicants will not be notified of the outcome of the evaluation.

Those who do not declare their acceptance of the research grant and do not present themselves at the research centre within the deadline communicated by the latter, even if not formally, shall lose the right to receive it. Exceptions to this term will only be granted in cases of documented force majeure.

Art. 8

The research activity cannot be started before signing the contract defining the terms and conditions of the collaboration.

The activity covered by the research grant must have the following characteristics:

- a) it must be carried out as part of the research programme covered by the grant and not be a merely technical support to it;
- b) it must have a close connection with the realization of the research program for which the winner of the grant has been awarded the contract;
- c) it must be continuous and, in any case, temporally defined, not merely occasional, and in coordination with the overall activity of the University;
- d) it must be carried out autonomously, solely within the limits of the programme prepared by the programme supervisor, without predetermined working hours.

The researcher is required to submit a detailed written report on the work carried out and the results achieved, accompanied by the opinion of the scientific supervisor, to the reference organisation at the intervals set out in the contract. The researcher must also submit interim reports and timesheets, if requested by the reference organisation.

Either the fellow or the reference organisation may withdraw from the contract.



The reference organisation may terminate the contract not only in the cases referred to in Article 9, sections 2 and 3, of the "Internal rules for awarding research grants pursuant to law 240 of 30 December 2010" of the University of Udine, but also in the event the research project and therefore the financial coverage on which the research grant is based cease to exist.

Art. 9

The following legal dispositions shall apply to the grant referred to in this call for applications:

- for tax matters, the provisions of Article 4 of Italian Law no. 476 of 13 August 1984, as subsequently amended and supplemented;
- for social security matters, the provisions of Article 2(26) *et seq.* of Italian Law no. 335 of 8 August 1995, as subsequently amended and supplemented;
- for mandatory maternity leave, the provisions of the Italian Ministerial Decree of 12 July 2007;
- with regard to sick leave, the provisions of Article 1(788) of Italian Law no. 296 of 27 December 2006 and subsequent amendments.

During the period of mandatory maternity leave, the allowance paid by INPS according to Art. 5 of the Italian Ministerial Decree of 12 July 2007 is supplemented by the University up to the full amount of the research grant.

The grant will be paid in monthly instalments.

Art. 10

The data collected as part of the procedure referred to in Art. 5 are necessary to properly manage the selection procedure, for any subsequent management of the research grant and for purposes related to managing services provided by the University. The University of Udine is the Data Controller. At any time, the data subject may request access, rectification and, depending on the University's institutional purposes, cancellation and restriction of processing or oppose the processing of their data. The data subject can always lodge a complaint with the Italian Data Protection Authority. The complete disclosure is available on the University of Udine website in the "Privacy" section, accessible from the home page www.uniud.it Direct Link: <https://www.uniud.it/it/it/pagine-speciali/guida/privacy>

Art. 11

For all matters not expressly mentioned in this call for applications, refer to the regulations in force on the subject cited in the introduction and to the "Internal rules for awarding research grants pursuant to Italian Law no. 240 of 30 December 2010" of the University of Udine, issued by Rector's Decree no. 182 of 31 March 2021.

Art. 12

The procedure supervisor is Dr Sandra Salvador, Head of the Research Services Area of the University of Udine.

The Responsible office at the University of Udine is "Area Servizi per la Ricerca - Ufficio Formazione per la Ricerca", via Mantica n. 31 - 33100 Udine, Italia.

To request information about the call for applications, please complete the following form available on the University of Udine website:

https://helpdesk.uniud.it/SubmitSR.jsp?type=req&accountId=universityofudine&populateSR_id=42105



Attachment A

Responsabile scientifico della ricerca / Principal investigator:

Nome e cognome / Name and surname: Marta Martini
Qualifica / Position: Professoressa Associata / Associate Professor
Dipartimento / Department: Scienze agroalimentari, ambientali e animali / Agricultural, Food, Environmental and Animal Sciences
Area MUR / Research field: 07 – Scienze agrarie e veterinarie
Settore concorsuale e Settore scientifico disciplinare / Scientific sector: 07/D1 – Patologia vegetale ed entomologia; AGR/12 – Patologia vegetale

Titolo dell'assegno di ricerca / Topic of the research fellowship "assegno di ricerca":

I bandi sono consultabili dal sito dell'Ateneo, del MUR e di Euraxess / The calls are available on the University, MUR and Euraxess websites

Testo in italiano:

Indagini sulla variabilità genomica di '*Candidatus Phytoplasma solani*' e sui meccanismi molecolari alla base della sua patogenicità in ospiti diversi.

Text in English:

Exploring the genomic variability of '*Candidatus Phytoplasma solani*' and the molecular mechanisms underlying its pathogenicity in different hosts.

Obiettivi previsti e risultati attesi del programma di ricerca in cui si colloca l'attività dell'assegnista di ricerca / Foreseen objectives and results of the research programme performed by the research fellow "assegnista di ricerca":

I bandi sono consultabili dal sito dell'Ateneo, del MUR e di Euraxess / The calls are available on the University, MUR and Euraxess websites

Testo in italiano:

'*Candidatus Phytoplasma solani*' (CaPso) è un batterio floematico trasmesso da insetti vettori, principalmente associato in Europa e nel bacino del Mediterraneo alla malattia del bois noir (BN) della vite e alle malattie dello stolbur delle solanacee, compreso il pomodoro (Quaglino et al., 2013). La complessa ecologia di CaPso, che coinvolge colture multiple, piante serbatoio e insetti vettori, rende difficile lo sviluppo di strategie di controllo efficaci. Per questo fitoplasma sono state descritte diverse linee evolutive o varianti molecolari basate sulla caratterizzazione molecolare di più geni variabili (cioè *tufB*, *secY*, *vmp1* e *stamp*) (Contaldo et al., 2021; Quaglino et al., 2021). Uno dei primi geni utilizzati per studi epidemiologici è il gene housekeeping *tufB* (fattore di allungamento Tu). L'analisi della sequenza del gene *tufB* ha rivelato che due tipi principali di ceppi di CaPso sono presenti sulla vite e su piante ospiti alternative in Italia secondo patosistemi diversi per caratteristiche epidemiologiche: (i) ortica/*H. obsoletus*/vite e ceppi del tipo tuf-a, e (ii) convolvolo/*H. obsoletus*/vite e ceppi del tipo tuf-b (Langer e Maixner et al., 2004; Mori et al., 2020).

Poiché i fitoplasmi sono difficili da coltivare, la loro sequenza genomica costituisce una fonte primaria di informazioni sulle loro caratteristiche biologiche (Hogenhout & Šeruga Musić, 2010). L'analisi delle sequenze genomiche di alcuni fitoplasmi ha consentito l'identificazione di diversi effettori (TENGU, SAP11, SAP21, PHYL1, SAP54), la cui azione patogena è stata verificata principalmente attraverso la loro espressione in piante modello transgeniche (Bai et al., 2009; Sugio et al., 2011; Hoshi et al., 2011; MacLean et al., 2011; Maejima et al., 2014). Tra le sequenze genomiche disponibili ci sono anche quelle di tre ceppi di CaPso: 284/09 (stolbur di tabacco), 231/09 (stolbur di prezzemolo) (Mitrović et al., 2014) e SA-1 (bois noir) (Šeruga Musić et al., 2018).



A causa della scarsa conoscenza dei fattori di patogenicità di CaPsoL e dell'importanza di comprendere le interazioni pianta ospite-patogeno per lo sviluppo di un'efficace gestione della malattia, l'obiettivo principale del presente progetto è quello di indagare questi argomenti per mezzo delle piante ospiti pomodoro e vite e di diversi ceppi di CaPsoL.

Per raggiungere questo obiettivo generale, il programma di ricerca si concentrerà sui seguenti obiettivi:

Obiettivo 1. Sequenziamento del genoma di ceppi di CaPsoL provenienti da patosistemi diversi per caratteristiche epidemiologiche. L'obiettivo è quello di effettuare il sequenziamento dell'intero genoma di alcuni ceppi di CaPsoL di diversa origine che sono stati trasmessi a pomodoro e di identificare i geni codificanti per proteine secrete dal fitoplasma (effettori, fattori di virulenza e altri). I ceppi di CaPsoL sono mantenuti mediante innesto in condizioni controllate presso l'Università di Udine. I ceppi di CaPsoL sono stati trasmessi a piante di pomodoro cv. Micro-Tom per mezzo di insetti adulti di *H. obsoletus*, che sono stati catturati su convolvolo oppure su ortica in vigneti ad alta incidenza di BN in Friuli-Venezia Giulia. Durante il loro mantenimento i ceppi hanno mostrato notevoli differenze nei sintomi indotti sulle piante di pomodoro cv. Micro-Tom: i ceppi da convolvolo hanno sviluppato sintomi di clorosi fogliare e miniaturizzazione, fillodia, big bud e infiorescenza a cavolfiore; mentre i ceppi da ortica mostravano sintomi di ingiallimento fogliare e miniaturizzazione, ingrossamento dei germogli e necrosi che dall'apice e dai germogli laterali progrediva verso il fusto principale, con conseguente morte della pianta.

Risultati attesi: diversi µg di DNA di alta qualità e ad alto peso molecolare che verranno processati per il sequenziamento. Long-reads e short-reads generate da whole genome sequencing utilizzando piattaforme NGS diverse (Debonneville et al., 2022). L'assemblaggio ibrido *de novo* di ceppi di CaPsoL consentirà potenzialmente di ottenere cromosomi circolari completi, di cui verranno determinate le dimensioni ed eventuali loro differenze tra i ceppi. Sarà anche possibile accertare la presenza di elementi extracromosomici. L'annotazione genetica consentirà di determinare il numero di geni condivisi dai ceppi e i geni che invece sono unici per ciascun ceppo. Verranno inoltre predetti CDS che codificano per peptidi segnale (SP) o domini transmembrana tra i CDS totali, nonché diverse potenziali unità mobili (PMU). Infine, sarà possibile compilare un elenco di tutti i CDS di CaPsoL che si prevede possano codificare per proteine secrete (effettori, fattori di virulenza e altri).

Obiettivo 2. Tipizzazione molecolare di ceppi di CaPsoL provenienti dall'agroecosistema vigneto. L'obiettivo è di tipizzare ceppi di CaPsoL provenienti da piante di vite affette da BN mediante analisi delle sequenze di molteplici geni (Quaglino et al., 2016; Piero et al., 2020) e di indagare le differenze nella loro virulenza in funzione della loro prevalenza in viti che presentano classi diverse di gravità dei sintomi. I ceppi di CaPsoL, rappresentativi della diversità genetica e dell'intensità dei sintomi rilevati sulle viti infette, saranno anche quantificati mediante qPCR (Carminati et al., 2021).

Risultati attesi: (i) selezione di vigneti affetti da BN in Friuli Venezia Giulia; (ii) mappe dei vigneti che indicano la posizione delle viti sintomatiche che presentano sintomi lievi, moderati e gravi; (iii) raccolta di DNA estratti da viti infette da CaPsoL con una gamma di gravità dei sintomi; (iv) identificazione di ceppi di CaPsoL distinti geneticamente sulla base di geni housekeeping e geni variabili codificanti per proteine di membrana; (v) associazione di ceppi distinti di CaPsoL con la gravità dei sintomi.

Obiettivo 3. Analisi di espressione di geni di CaPsoL codificanti per proteine secrete in piante ospiti. L'obiettivo è studiare le interazioni molecolari del fitoplasma con la pianta ospite mediante analisi qRT-PCR su piante di pomodoro infette da CaPsoL in condizioni controllate e su piante di vite naturalmente infette nei vigneti. L'analisi dell'espressione fornirà delucidazioni su come sono regolati i geni del fitoplasma e rivelerà alcuni dettagli di base della biologia del fitoplasma e del suo comportamento patogenico.

La scelta della corretta strategia per la normalizzazione delle quantità dei trascritti rappresenta un importante collo di bottiglia per gli esperimenti di espressione genica; un metodo interessante che si potrebbe adottare è quello di Pacifico et al. (2019).

Risultati attesi: per almeno alcuni dei geni selezionati ci aspettiamo di trovare valori diversi di Indice di Espressione (EI) a seconda del ceppo di CaPsoL o della gravità dei sintomi nel pomodoro e nella



vite. Sarà inoltre possibile confrontare i livelli di trascrizione tra piante ospiti di vite e di pomodoro infettate dallo stesso ceppo di CaPsoI.

Text in English:

'*Candidatus Phytoplasma solani*' (CaPsoI) is an insect-transmitted phloem-limited bacterium mainly associated in Europe and the Mediterranean basin with bois noir (BN) disease of grapevine and stolbur diseases of solanaceous species including tomato (Quaglino et al., 2013). The complex ecology of CaPsoI, involving multiple crops, reservoir plants, and insect vectors, makes difficult the development of effective control strategies. Many genetic lineages or variants were described for this phytoplasma based on molecular characterization on multiple variable genes (i.e., *tufB*, *secY*, *vmp1*, and *stamp*) (Contaldo et al., 2021; Quaglino et al., 2021). One of the first genes used for epidemiological studies is the housekeeping gene *tufB* (elongation factor Tu). The sequence analysis of *tufB* gene revealed that two main CaPsoI *tufB*-types are present on grapevines and alternative host plants in Italy according to diverse ecological pathosystems: (i) stinging nettle-*H. obsoletus*-grapevine *tufB*-type a, and (ii) field bindweed-*H. obsoletus*-grapevine *tufB*-type b (Langer and Maixner et al., 2004; Mori et al., 2020).

Since phytoplasmas are difficult to cultivate, their genomic sequence is a primary source of information about their biological features (Hogenhout & Šeruga Musić, 2010). A mining search on full and draft genome sequences of some phytoplasmas allowed the identification of several effectors (TENGU, SAP11, SAP21, PHYL1, SAP54), whose pathogenic action was verified mainly by their expression in transgenic model plants (Bai et al., 2009; Sugio et al., 2011; Hoshi et al., 2011; MacLean et al., 2011; Maejima et al., 2014). Draft genome sequences of three CaPsoI strains are available: 284/09 (stolbur of tobacco), 231/09 (stolbur of parsley) (Mitrović et al., 2014), and SA-1 (bois noir) (Šeruga Musić et al., 2018).

Due to the lack of knowledge on CaPsoI pathogenicity factors and the importance of understanding the host-pathogen interactions for developing effective disease management, the main aim of the present project is to investigate these topics by means of plant hosts (tomato and grapevine) and CaPsoI strains.

To reach the general goal, the research program will focus on the following objectives:

Objective 1. Genome sequencing of CaPsoI strains from diverse ecological pathosystems. The aim is to carry out a whole genome sequencing of CaPsoI strains infecting tomato from different origins and to identify genes encoding for phytoplasma secreted proteins (effectors, virulence factors, and others). CaPsoI strains are maintained by grafting in controlled conditions at the University of Udine. CaPsoI strains were transmitted to tomato cv. Micro-Tom plants by means of *H. obsoletus* adult insects, which were captured from bindweed or stinging nettle in vineyards with high incidence of BN in Friuli-Venezia Giulia. Transmitted CaPsoI strains show remarkable differences in the symptoms induced on tomato cv. Micro-Tom plants: bindweed-associated strains developed symptoms of leaf chlorosis and miniaturization, phyllody, big bud and cauliflower-like inflorescence; nettle-associated strains showed symptoms of leaf yellowing and miniaturization, shoot thickness and necrosis that from the apex and lateral shoots progressed towards the main stem, eventually resulting in plant death.

Expected results: several µg of high quality and high-molecular-weight DNA will be processed for sequencing. Long- and short-reads generated by whole genome sequencing performed using different NGS platforms (Debonneville et al., 2022). *De novo* hybrid assembly of CaPsoI strains will potentially allow to obtain circular complete chromosomes) and differences within the genome size of the strains will be determined. It will be also possible to establish the presence of extrachromosomal elements. Gene annotation will allow to determine the number of genes which are shared by the strains and genes which are unique for each strain. Several CDS predicted to encode signal peptide (SP) or transmembrane domain among the total CDS will be expected as well as several potential mobile units (PMUs). Finally, it will be possible to compile a list of all CaPsoI CDS predicted to encode secreted proteins (effectors, virulence factors, and others).



Objective 2. Molecular typing of CaPsol strains from vineyard agroecosystems. The aim is to type CaPsol strains from BN-affected grapevines by multiple gene sequence analyses (Quaglino et al., 2016; Pierro et al., 2020) and to investigate differences in their virulence studying their prevalence in grapevines exhibiting a range of symptom severity. CaPsol strains, representative of revealed genetic diversity and symptom intensity on infected grapevines, will be also quantified by qPCRs (Carminati et al., 2021).

Expected results: (i) Selection of BN-affected vineyards in Friuli Venezia Giulia; (ii) vineyard maps indicating the position of symptomatic grapevines exhibiting mild, moderate, and severe symptoms; (iii) collection of DNAs extracted from CaPsol-infected grapevines with a range of symptom severity; (iv) Identification of genetically distinct CaPsol strains based on molecular markers in variable genes and secreted protein gene patterns / nucleotide sequence variants; (v) association of distinct CaPsol strains with symptom severity degree.

Objective 3. Expression analyses of CaPsol genes encoding for secreted proteins in plant hosts. The aim is to investigate the molecular phytoplasma-host interactions by means of qRT-PCR analysis on CaPsol infected tomato in controlled conditions and in infected grapevines in vineyards. The expression analysis of CaPsol target genes encoding for secreted proteins will give elucidations on how phytoplasma genes are regulated and will reveal basic details of the phytoplasma biology and pathogenic behavior. Choosing the correct strategy for normalization of transcript amounts represents an important bottleneck for gene expression experiments; an interesting method to follow is that of Pacifico et al. (2019).

Expected results: for at least some of the selected genes we expect to find different values of Expression Index (EI) according to the CaPsol strain or symptoms severity in tomato and grapevine. It will be also possible to compare transcript levels among grapevine and tomato plant hosts infected by the same CaPsol strain.

Referenze / References:

- Bai X, Correa VR, Toruño TY, Ammar E-D, Kamoun S, Hogenhout SA (2009) *Molecular Plant-Microbe Interactions*, 22: 18-30.
- Carminati G, Brusa V, Loschi A, Ermacora P, Martini M (2021) *Pathogens*, 10: 811.
- Contaldo N, Stepanović J, Pacini F, Bertaccini A, Duduk B (2021) *Microorganisms*, 9: 2530.
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Struttura dell'Università di Udine presso la quale verrà sviluppata l'attività di ricerca / Department or other structure of the University of Udine where research activities will be carried out:

Dipartimento di Scienze Agroalimentari, Ambientali e Animali (DI4A) / Department of Agricultural, Food, Environmental and Animal Sciences

Importo dell'assegno di ricerca (al lordo oneri carico assegnista) / Total grant gross for the research fellowship:

€ 29.184,00

Durata dell'assegno di ricerca / Duration of the research fellowship "assegno di ricerca":

18 mesi / months

Finanziamento / Financed by:

La copertura finanziaria graverà sul progetto PRIN 2022 – "Exploring the genomic variability and the molecular MEchanisms underlying the PAtogenesis of 'Candidatus Phytoplasma SOLani' (MEPASOL)"; Prot. n. 2022FCZTAK. Decreto di finanziamento n. 1048 del 14/07/2023 - Settore LS9. Codice CUP G53D23004080006. Ministero dell'Università e della Ricerca (Finanziato dall'Unione Europea, NextGenerationEU).

Requisiti di ammissione / Minimum qualifications necessary:

- Possesso di un diploma di laurea vecchio ordinamento (ante decreto 3 novembre 1999 n. 509) o di laurea specialistica/magistrale (ex decreto 3 novembre 1999 n. 509 e decreto 22 ottobre 2004 n. 270) o titolo equivalente conseguito all'estero;
- possesso di un curriculum scientifico professionale idoneo allo svolgimento dell'attività di ricerca contemplata.
- University degree obtained before Decree n. 509 of 3 November 1999 or specialistic/Master's degree (post decree n. 509 of 3 November 1999 and decree n. 270 of 22 October 2004) or equivalent degree obtained abroad;
- professional scientific curriculum suitable for the research activity above mentioned.

Procedura selettiva / Competition procedure:

Valutazione per titoli e colloquio / Evaluation of titles and oral exam

I risultati della valutazione dei titoli saranno resi noti agli interessati nel corso del colloquio / The evaluation of the qualifications will be disclosed to candidates during the interview



Calendario del colloquio / Calendar of the oral exam	Modalità / Modality	Videoconferenza / Videoconference
	Data / Date	22 novembre / November 2023
	Ora / Time	9:00 / 9:00 am (Italian time)
	Luogo / Place	-

Per sostenere il colloquio i candidati devono esibire un valido documento di riconoscimento. /
Candidates must come to the interview with a valid identity document.

Eventuali variazioni saranno rese note esclusivamente mediante pubblicazione all'albo ufficiale on line dell'Ateneo / Any change will be made public solely through publication on the University web site
http://web.uniud.it/ateneo/normativa/albo_ufficiale

Nota / Note: Le indicazioni sulle modalità di svolgimento della prova in modalità telematica saranno inviate ai candidati con successiva email da parte del Presidente della Commissione. Ai fini dell'identificazione e a pena di esclusione dalla procedura selettiva, ciascun candidato è tenuto ad identificarsi prima che il colloquio abbia inizio, esibendo il medesimo documento di identità allegato alla domanda di ammissione al concorso. Il candidato deve risultare reperibile nella giornata e all'orario indicato sul bando. Il mancato collegamento, l'irreperibilità del candidato nel giorno o nell'orario stabilito o la mancata esibizione del documento identificativo, sono motivo di esclusione dalla procedura selettiva. La registrazione delle prove orali è vietata. L'Ateneo adotterà pertanto tutti i provvedimenti in suo potere per tutelare i soggetti coinvolti qualora venissero diffuse tramite internet – o altri mezzi di diffusione pubblica – video, audio o immagini della procedura selettiva. / Instructions on how the video interviewing will be conducted will be provided to candidates by the Chairman of the Examining Board via email. For identification purposes, each candidate is required to identify him/herself before the interview by exhibiting the same identification document attached to the application. Candidates must be available on the day and time established by the call for applications. Failure of the candidate to establish a video connection, the unavailability of the candidate on the day and/or time established or failure of the candidate to provide the required identification document are all grounds for exclusion from the selection procedure. Recording of the video interviews is prohibited. The University will adopt all the measures within its power to protect all personnel involved as a result of dissemination via the internet or via other forms of public dissemination, of videos, audios or other pictures of the selection procedures.

Commissione giudicatrice / Examining Board:

Nome e Cognome	Qualifica	SSD	Università
Membri Effettivi / Permanent members			
Fabio Quaglino	PA	AGR/12	Università degli Studi di Milano
Marta Martini	PA	AGR/12	Università degli Studi di Udine
Paolo Ermacora	RU	AGR/12	Università degli Studi di Udine
Membri Supplenti / Temporary members			
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Giuseppe Firrao	PO	AGR/12	Università degli Studi di Udine