



European Culture Collections: Achieving Greater Impact Through Collaboration

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Global Lead Microbiology

USCCN Meeting

Providence Rhode Island

07/31/26

TOGETHER WE CULTURE
DIVERSITY, TODAY AND TOMORROW ♥

PRESERVE
SHARE
COLLABORATE
DISCOVER ♥

CULTURE COLLECTION

CABI – An international
Perspective

European Collections and
Infrastructure

ECCO, MIRRI and
UKBRCN

EU / UK Projects

The Future



CABI – International Development

Our areas of focus, serving our 48 member countries



**Food and nutrition
security**



**Climate change
and biodiversity**



**Youth and
gender**



**Economic
development**



Strengthen systems for detection and response to pest outbreaks



Enhance advisory tools to boost climate-smart plant health practices



Enhance availability of safer plant protection products



Increase supply of and demand for safer and higher quality food



CABI (IMI) collection since 1947

A resource of 30,000 living microorganisms, representing 6,000 fungal species

Strains deposited by scientists from across the world, mainly from CABI projects

Focus on agriculture and the environment

Over 55% plant associated

Culture maintained using state-of-the art (incl. Stirling Cycling) preservation techniques to keep the cultures in optimal condition

IDA under the Budapest Treaty for Patent Deposits

Incorporates UK, BAS & NCWRF collections

CABI is custodian of the resources on behalf of its member countries



Major H Dade,
Founder



Fig. 4. *Gibellula attenboroughii* growing on an orb-weaving cave spider (*Meta menardi*) in Northern Ireland [Image: © CABI]

Sequencing in Partnership

CABI is contributing to the Wellcome trust-funded Darwin Tree of Life Project which is an initiative to sequence the genomes of all 60,000+ eukaryote species in the British isles, including several thousand fungi. Beyond this, we are seeking partners to sequence our entire living collection. Can you help?



Natural
History
Museum

EMBL-EBI



Kew
ROYAL BOTANIC GARDENS

Flemings *Penicillium*: Strains held in CABI's collection since 1947 Optimally maintained by cryopreservation

Reference: Pathak, Nowell, Wilson, Ryan & Barraclough, 'Comparative genomics of Alexander Fleming's original *Penicillium* isolate (IMI 15378) reveals sequence divergence of penicillin synthesis genes,' 24 September 2020, **Scientific Reports**, DOI: 10.1038/s41598-020-72584-5



Scientists sequence the 92-year-old mold that produced the first antibiotic, penicillin



By Katie Hunt, CNN

Updated 1133 GMT (1933 HKT) September 24, 2020



This mold was regrown from Alexander Fleming's frozen sample that produced the first antibiotic, penicillin.

(CNN) — The accidental discovery of penicillin by Alexander Fleming in 1928, when mold contaminated one of his petri dishes, changed the course of modern medicine, with antibiotic key to the decline of many diseases over the course of the 20th century.

Imperial College
London



Collections facilitating research

Imperial College
London



We used whole genome approaches to understand the evolution of fungi. For example, the coffee wilt pathogen (*F. xylarioides*) and the correlation to disease outbreaks. We also provided further evidence for inter-specific horizontal gene transfer and 'Starships' in *Fusarium*

Peck et al. *Plos Biology* (2024) <https://doi.org/10.1371/journal.pbio.3002480>



Microsoft
CoPilot

Science

Historic Fungal Genomes Reveal How Gene Swapping Fuels Recurring Coffee Wilt

Lily Peck, University of California, Los Angeles | The Conversation

CRBC NEWS

Major European Culture Collections



Europe is home to some of the world's most prestigious culture collections



Little provision in 'biodiverse' rich areas e.g. just 17 WDCM registered collections in the whole of Africa



Ryan MJ, McCluskey K, et al. (2019) Fungal biological resources to support international development: challenges and opportunities. *WJMB* 35: 139.



European Culture Collections' Organisation (ECCO)



Established in 1981

Is a non-profit organisation domiciled in Belgium

Promotes the collaboration and exchange of ideas and information on all aspects of culture collection activity.

ECCO's members consist of 90 public biological resource centres from 24 European countries

Collection members **MUST** publish a catalogue and be registered on WDCM

Collections pay a yearly membership fee



ECCO holds an annual meeting attracting up to 150 participants, includes social activity (the 'ECCO' family is very important!)

The Microbial Resource Research Infrastructure — European Research Infrastructure Consortium (MIRRI-ERIC)



MIRRI is the European distributed Research Infrastructure for the preservation, systematic investigation, provision, and valorisation of microbial resources and biodiversity. It accelerates European research, innovation and competitiveness in biosciences and bioindustry, encompassing a vision of a greener, healthier, and more sustainable world

Established by the Commission Implementing Decision (EU) 2022/1204 of 16 June 2022

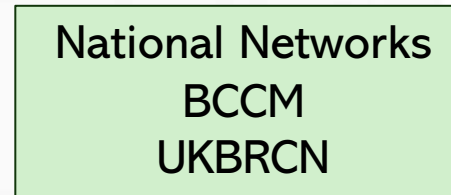
Brings together 47 microbial domain Biological Resource Centres (mBRCs), culture collections, and research institutes, from eight EU Member States: Belgium, France, Greece, Italy, Latvia, Portugal, and Spain (+ Romania – observer).

It offers access to an unparalleled collection of over 180,000 high-quality microbial resources from across Europe in the Catalogue of Microbial Resources and Data. It includes bacteria, archaea, filamentous fungi, yeasts, microalgae and viruses.

Offers access to a wide array of harmonised, world-class microbial resources, data, and services in full legal compliance

MIRRI-ERIC hosts a General Services Catalogue and the Application-Specific Services Catalogue. In addition, users can access the Training Gateway.

How does it all fit together?



↑
INFRASTRUCTURES

The UK Biological Resource Centre Network

Bringing together the UK's expert centres in biological resource curation



Receives no direct funding for its activities

Relies on the institutional support of its member collections

Coordinated by the UK Health Security Agency (UKHSA)

UKNCC and UKFCC now extinct

The UKBRCN comprises of 14 partner collections and 2 associate member collections:

The EU Microbiome (RI) Biobanking Enabler (EU Microbe)



Partners

AIT (Lead)
CABI
DSMZ
EMBL
HMGU
INRAe
MUG
RTD services
Sorbonne
(Roscoff)



MICROBE operational blueprint for the establishment of microbiome biobanking



Transfer to end users

Translation to other environments

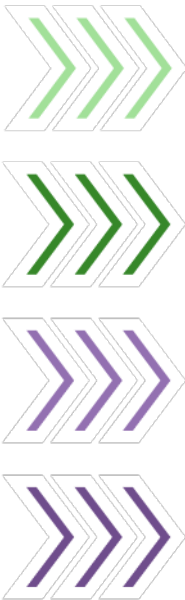


The Soil use case – an ambitious experiment

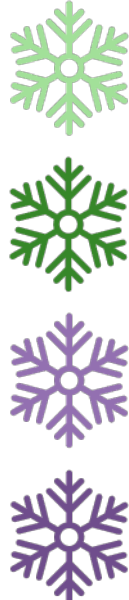
Control @ 4C
R x 3-5



Partners involved
AIT – CABI- DSMZ
2 German Soils
[Histosol / Cambisol]



Apply
Preservation
Methods (16)



Store



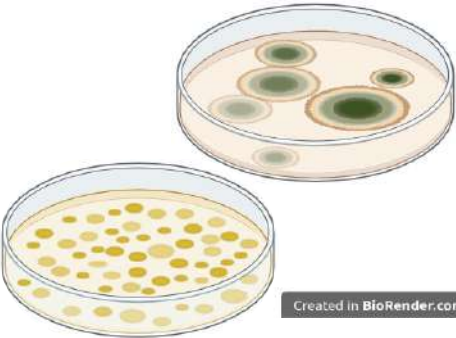
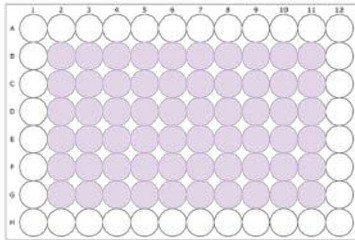
Analysis Post -
Preservation
timepoints (4)

GENOTYPE

A C A C G C T A A
A T C T A T C A C

MGnify

PHENOTYPE / FUNCTION



Methods used



Microbes-4 Climate

Main goal

Understand how microorganisms, plants, and soils interact in the context of climate change;

M4C approach

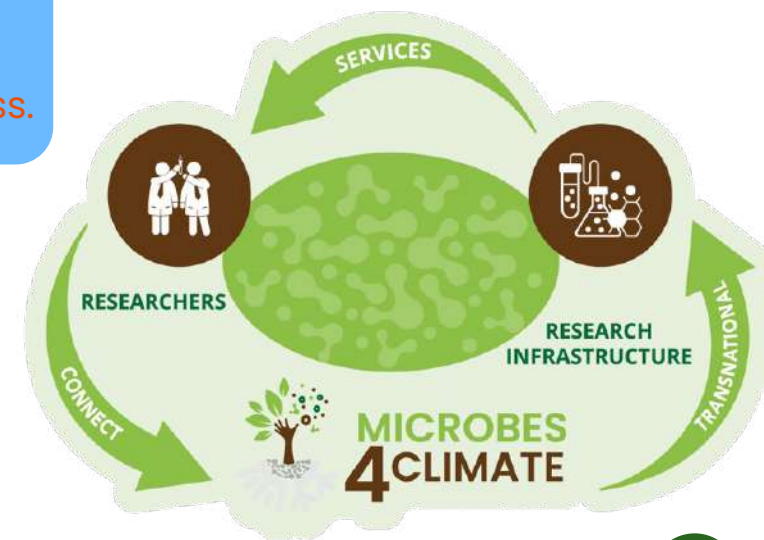
To provide access to advanced Research Infrastructures (RIs) and expert support, and offer of training opportunities for researchers;

Focus area

- 1) Study of microbial contributions to biodiversity and ecosystem resilience;
- 2) Exploration on how microbes can enhance plant and crop resistance to climate stress.

Impact

Strengthen sustainable agriculture and forestry, and support biodiversity conservation under climate change conditions



M4C – About the project



31 partners

23 beneficiaries,
7 associated entities &
1 associated partner

4 Research Infrastructures

MIRRI-ERIC, EMPHASIS,
LifeWatch-ERIC ,AnaEE-ERIC

Project name
Microbes-4-Climate

Acronym
M4C

Grant agreement n°
101131818

Topic
**HORIZON-INFRA-2023
SERV-01-02**



Total budget (EUR)
14 494 818.43



Start/End date
Feb 2024/Jan 2029
60months

Project Coordinator
MIRRI-ERIC



MIRRI MICROBIAL ERIC
RESEARCH
INFRASTRUCTURE
EUROPEAN RESEARCH INFRASTRUCTURE CONSORTIUM

European collaborative working

Delivering standards and best practice
Improving Methods
Facilitating Science Research
Improving access for users



Volume 3, Issue 2
2026

JOURNAL ARTICLE

**Policy in Practice: How to do the Nagoya Protocol:
common misconceptions, challenges and best
practices for access and benefit-sharing compliance**



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From “synthetic” to defined microbial communities for clearer terminology

[Hanna Koch](#) , [Thomas Clavel](#), [Cintia Mayr](#), [Benjamin L. Colman](#), [Michael Schloter](#), [Julia A. Vorholt](#), [Yolanda Sanz](#), [Tomislav Cernava](#), [Gwynn A. Beattie](#), [Lene Lange](#), [Stéphane Chaillou](#), [Ákos T. Kovács](#), [Hauke Smidt](#), [Corné M. J. Pieterse](#), [Tanja Kostic](#), [Omri M. Finkel](#), [Christopher E. Lawson](#), [Luca Coccolin](#), [Jesús Mercado-Blanco](#), [Robert D. Finn](#), [Kalliopi K. Papadopoulou](#), [Matthew Ryan](#), [Marco Candela](#), [Paul D. Cotter](#), ... [Angela Sessitsch](#)  [+ Show authors](#)

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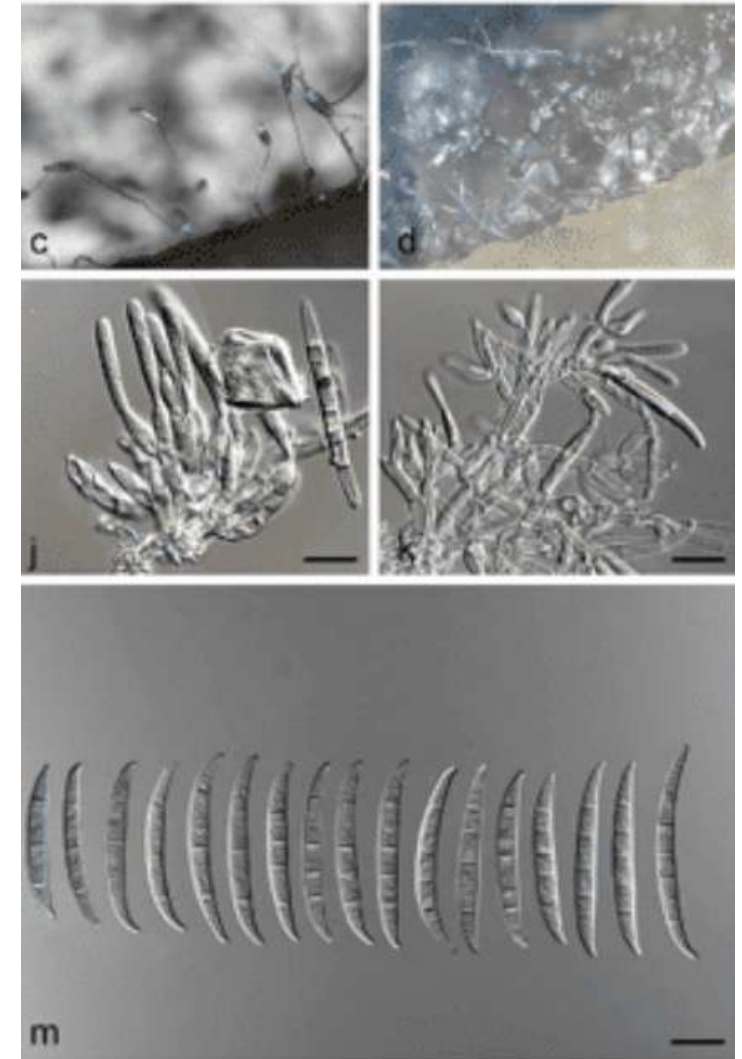
Consortia of microbial isolates, also known as synthetic communities (SynComs), are increasingly used to study and harness microbe-microbe and microbe-host interactions. Since “synthetic” potentially evokes negative connotations, we propose adopting the term “Defined Microbial Community” for practical applications.

Fusarium Projects

The Westerdijk institute (led by Pedro Crous) is currently leading a reappraisal of the genus *Fusarium*. Only possible through international collaboration (NRRL also involved)

CABI supplied over 1,000 strains deposited in CABI's GRC between 1947 and 2012.

If preliminary data (Sandoval-Denis et al., 2025) are indicative of the full results they may be newly described species.



Courtesy & © of the
Westerdijk Institute

Microbiome Cryobanking Model



UK Crop Microbiome Biobank – worlds first

36,000 collective strain deposits from crops/soil

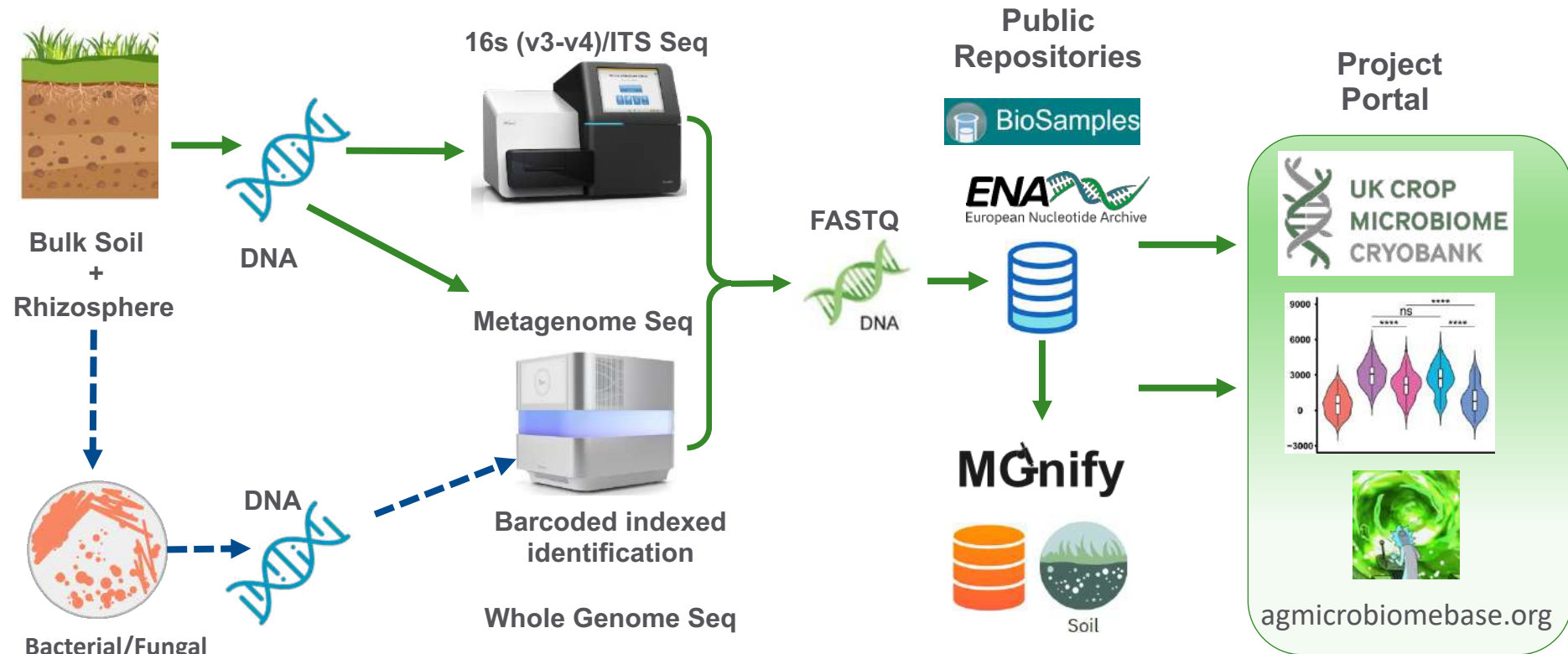
Soil library 315 plus metagenomes & data through
agmicrobiomebase

Model being replicated across the world

Major research output on the basis that crops recruit
microbes



Task 2: Crop Microbiome Cryobank Sequencing data



For further info and case studies see Yau et al. 2025: <https://www.researchsquare.com/article/rs-6445717/v1>

Scrutinising Biological collections data

ISME Communications, 2026, 6(1), ycag083

<https://doi.org/10.1093/ismeco/ycag083>

Published: 28 March 2026

Original Article



Host plant selects bacterial rhizosphere microbiome function whereas community structure is determined by soil legacy

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Preserve, Share, Collaborate, Discover

Return of NSF/UKRI/DFG funding?

Collections must embrace emerging technologies, 'standing still' is not an option

Genome sequencing is key – best achieved through collaboration

Work together to ensure better coverage of key taxa

Help developing countries to conserve their own biodiversity

Use collections to help address global issues





CABI is an international intergovernmental organisation, and we gratefully acknowledge the core financial support from our member countries (and lead agencies) including:



Ministry of Agriculture and
Rural Affairs,
People's Republic of China



Agriculture and
Agri-Food Canada



Ministry of Foreign Affairs of the
Netherlands



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC