Climate change research in soil sciences: review and future collaboration possibilities

LITHUANIAN RESEARCH CENTRE FOR AGRICULTURE AND FORESTRY

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RDI project manager

100 LITHUANIAN RESEARCH CENTRE FOR AGRICULTURE AND FORESTRY
PLANT BREEDING 1922–2022

100 years of scientific experience against the threats of changing climate

3 Institutes
5 Experimental Stations
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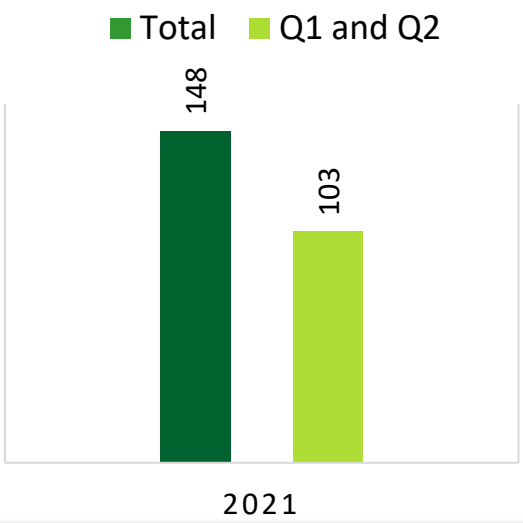
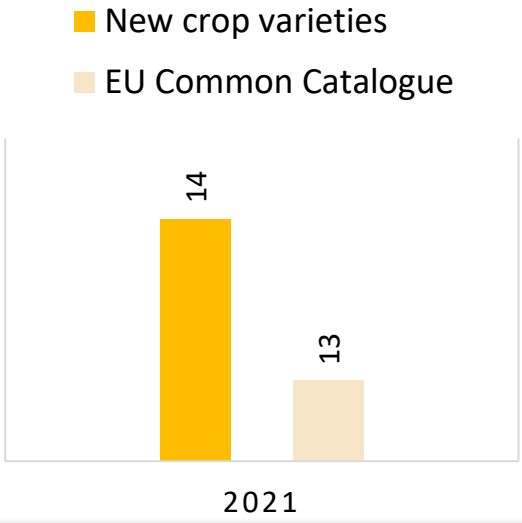
Major facts

Publishing



Crop Varieties



Contracts

Top 5 scientific papers IF [9.0-21.00]

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DOI: 10.1111/gcb.15897

PRIMARY RESEARCH ARTICLE

Global Change Biology WILEY

Achievable agricultural soil carbon sequestration across Europe from country-specific estimates

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Abstract

The role of soils in the global carbon cycle and in reducing GHG emissions from agriculture has been increasingly acknowledged. The '4 per 1000' (4p1000) initiative has become a prominent action plan for climate change mitigation and achieve food security through an annual increase in soil organic carbon (SOC) stocks by 0.4%, (i.e. 4‰ per year). However, the feasibility of the 4p1000 scenario and, more generally, the capacity of individual countries to implement soil carbon sequestration (SCS) measures remain highly uncertain. Here, we evaluated country-specific SCS potentials of

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REVIEW

Anthocyanins: From plant pigments to health benefits at mitochondrial level

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ABSTRACT

Anthocyanins are water-soluble pigments providing certain color for various plant parts, especially in edible berries. Earlier these compounds were only known as natural food colorants, the stability of which depended on pH, light, storage temperature and chemical structure. However, due to the increase of the in vitro, in vivo experimental data, as well as of the epidemiological studies, today anthocyanins and their metabolites are also regarded as potential pharmaceutical compounds providing various beneficial health effects on either human or animal cardiovascular system, brain, liver, pancreas and kidney. Many of these effects are shown to be related to the free-radical scavenging and antioxidant properties of anthocyanins, or to their ability to modulate the intracellular antioxidant systems. However, it is generally overlooked that instead of acting exclusively as antioxidants certain anthocyanins affect the activity of mitochondria that are the main source of energy in cells. Therefore, the aim of the present review is to summarize the major knowledge about the chemistry and regulation of biosynthesis of anthocyanins in plants, to overview the facts on bioavailability, and to discuss the most recent experimental findings related to the beneficial health effects emphasizing mitochondria.

KEYWORDS

Biosynthesis; bioavailability and metabolism; neuro- and cardioprotection; hepatoprotection; kidney and pancreas; oxidative phosphorylation

SCIENCE ADVANCES | RESEARCH ARTICLE

ECOLOGY

Ozone affects plant, insect, and soil microbial communities: A threat to terrestrial ecosystems and biodiversity

Evgenios Agathokleous[1]*, Zhaozhong Feng[1]*, Elina Oksanen[2], Pierre Sicard[3], Qi Wang[1], Costas J. Saitanis[4], Valda Araminiene[5], James D. Blande[6], Felicity Hayes[7], Vicent Calatayud[8], Marisa Domingos[9], Stavros D. Veresoglou[10], Josep Peñuelas[11,12], David A. Wardle[13], Alessandra De Marco[14], Zhengzhen Li[15], Harry Harmens[7], Xiangyang Yuan[15], Marcello Vitale[16], Elena Paoletti[17]

Elevated tropospheric ozone concentrations induce adverse effects in plants. We reviewed how ozone affects (i) the composition and diversity of plant communities by affecting key physiological traits; (ii) foliar chemistry and the emission of volatiles, thereby affecting plant-plant competition, plant-insect interactions, and the composition of insect communities; and (iii) plant-soil-microbe interactions and the composition of soil communities by disrupting plant litterfall and altering root exudation, soil enzymatic activities, decomposition, and nutrient cycling. The community composition of soil microbes is consequently changed, and alpha diversity is often reduced. The effects depend on the environment and vary across space and time. We suggest that Atlantic islands in the Northern Hemisphere, the Mediterranean Basin, equatorial Africa, Ethiopia, the Indian coastline, the Himalayan region, southern Asia, and Japan have high endemic richness at high ozone risk by 2100.

ELSEVIER

Journal of Cleaner Production
Volume 321, 25 October 2021, 129005

Sustainability impact assessment of glue laminated timber and concrete-based building materials production chains – A Lithuanian case study

Povilas Žemaitis [a], Edgaras Linkevičius [b], Marius Aleinikovas [a], Diana Tuomasjukka [c]

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Fungal Diversity (2021) 111:573–588
https://doi.org/10.1007/s13225-021-00493-7

The Global Soil Mycobiome consortium dataset for boosting fungal diversity research

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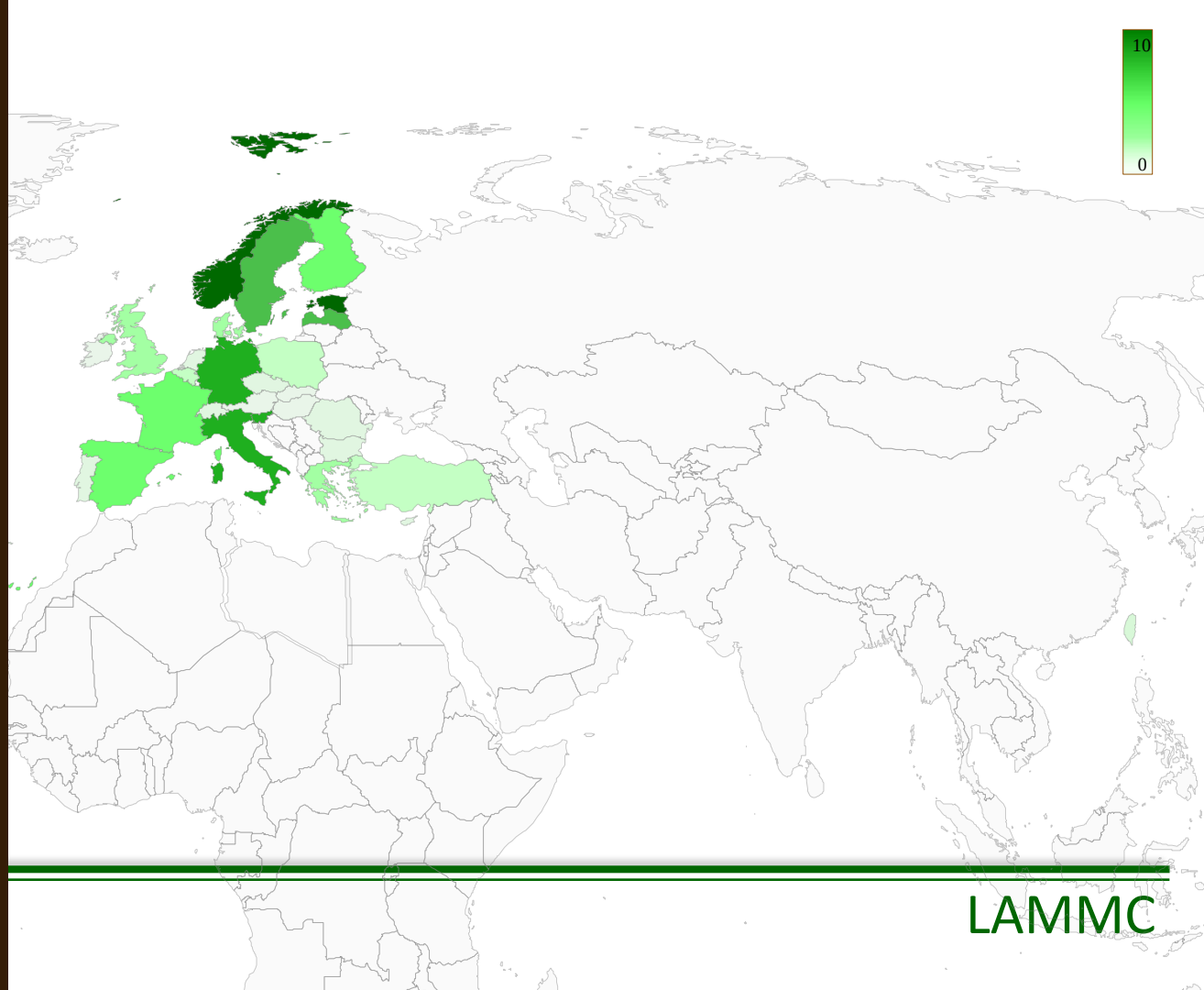
Abstract

Fungi are highly important biotic components of terrestrial ecosystems, but we still have a very limited understanding about their diversity and distribution. This data article releases a global soil fungal dataset of the Global Soil Mycobiome consortium (GSMc) to boost further research in fungal diversity, biogeography and macroecology. The dataset comprises 722,682 fungal operational taxonomic units (OTUs) derived from PacBio sequencing of full-length ITS and 18S-V9 variable regions from 3200 plots in 108 countries on all continents. The plots are supplied with geographical and edaphic metadata.

International projects 26

Involved in consortium with countries 29

Cooperation with more than EU institutions 70



LAMMC

180+ PARTNERSHIPS WITH BUSINESS

100 + RESEARCH PROJECTS

60 NATIONAL

40 INTERNATIONAL

Growing startups

MB Inferna

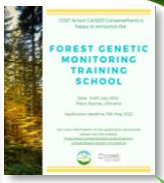
NATURE'S ELEMENT

UAB Mėlynė

UAB Innofoods

How to collaborate with us?

Participation in our international events



EGF 2023

22nd EGF Symposium 2023
11-14 June 2023,
Vilnius, Lithuania

AGROVIZIJA
MEET THE FUTURE OF AGRICULTURE
2022 June 29 – July 1

Development of project proposal and Submission

NordForsk

Interreg

Iceland Liechtenstein Norway grants

HORIZON EUROPE

ENETWILD

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Life

The European Green Deal

SusCrop – ERA-NET
Cofund on Sustainable Crop Production
FACCEJPI

SNS
Nordic Forest Research

EU MISSIONS

Application for PhD programmes and PostDoc

Agronomy and Forestry
(jointly with Vytautas Magnus University)

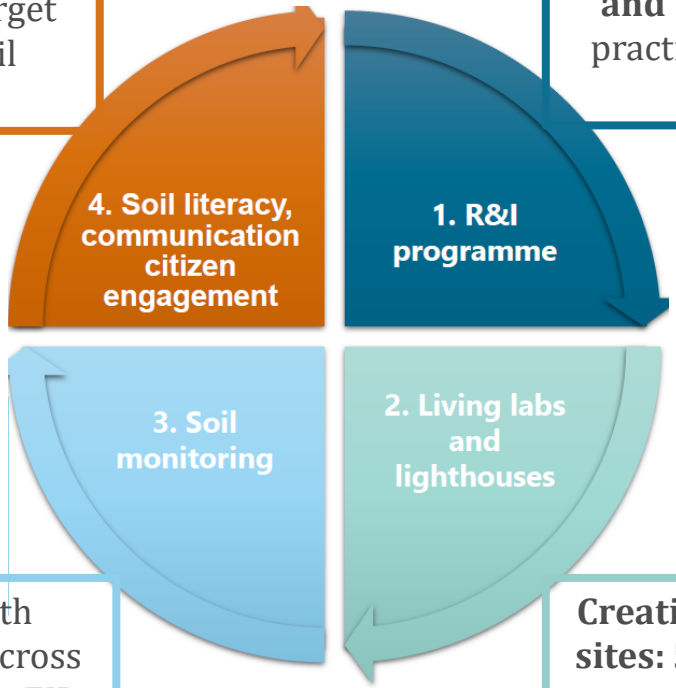
Ecology and Environmental Science
(jointly with Vytautas Magnus University)

Biochemistry
(jointly with Vytautas Magnus University and Lithuanian University of Health Sciences)

Basis for living labs and lighthouses

Communication, training and advise targeted to different target groups; co-working with soil advisors.

Knowledge, data, technologies and infrastructures to support practices and business models for soil health



Harmonization of soil health **monitoring and reporting** across Europe; LAMMC participate in EJP SOIL, implemented soil monitoring

Creation of a network of real-life sites: 5-6 sites in every Baltic state, research institute's infrastructure, consultation

Basis for living labs and lighthouses

Phase 1 (2021-2024)

Step 1

Preparatory actions:

- **Mapping of LL and soil needs**
- **Engagement sessions** and other activities for capacity building
- **LL Support Structure** to cater for the needs of the emerging living labs.

Step 2

Creation of Living Labs:

Launch of 1st call for establishing a transnational cluster of LL

Phase 2 (2025-2026)

Expansion of LL:

Launch of successive calls for expanding the network of LL

→ Look at wide coverage of geographies (EU and AC), themes (Mission's objectives) and land uses (agricultural, forest, urban, industrial).

Phase 3 (2027 onwards)

Scaling up of LL:

Launch of last calls for setting LL,

→also measures to facilitate the mainstreaming, continuation and sustainability of the LL beyond the Mission timeframe.

A gradual development of 100 Living Labs across Europe

Express interest to cooperate as partners:

- HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions
- HORIZON-CL6-2022-BIODIV-01-05: Intercropping – understanding and using the benefits of complexity in farming and value chains
- HORIZON-CL6-2022-BIODIV-01-06: Monitoring and effective measures for agrobiodiversity
- HORIZON-CL6-2022-BIODIV-01-07: Protection and sustainable management of forest genetic resources of high interest for biodiversity, climate change adaptation, and forest reproductive materials
- HORIZON-CL6-2022-BIODIV-01-08: Assessing the nexus of extraction, production, consumption, trade and behaviors patterns and of climate change action on biodiversity in the context of transformative change
- HORIZON-CL6-2022-BIODIV-01-10: Cooperation with the Convention on Biological Diversity
- HORIZON-CL6-2022-BIODIV-02-02-two-stage: Boosting breeding for a sustainable, resilient and competitive European legume sector
- HORIZON-CL6-2022-FARM2FORK-01-02: Socio-economics of pesticide use in agriculture
- HORIZON-CL6-2022-FARM2FORK-01-03: Enhancing biosecurity in terrestrial livestock production
- HORIZON-CL6-2022-FARM2FORK-01-05: Integrated and sustainable freshwater bioeconomy: Combining aquaculture, biodiversity preservation, biotechnology and other uses
- HORIZON-CL6-2022-FARM2FORK-01-07: Building alternative protein-friendly sustainable and healthy food environments
- HORIZON-CL6-2022-FARM2FORK-01-08: Research and innovation for food losses and waste prevention and reduction through harmonised measurement and monitoring
- HORIZON-CL6-2022-FARM2FORK-01-09: Microbiomes in food production systems
- HORIZON-CL6-2022-FARM2FORK-01-10: Integrated surveillance system to prevent and reduce diet-related non communicable diseases (NCDs)
- HORIZON-CL6-2022-FARM2FORK-01-11: Effective systems for authenticity and traceability in the food system
- HORIZON-CL6-2022-FARM2FORK-02-01-two-stage: Agroecological approaches for sustainable weed management
- HORIZON-CL6-2022-FARM2FORK-02-02-two-stage: Emerging and future risks to plant health
- HORIZON-CL6-2022-CIRCBIO-01-02: Marginal lands and climate-resilient and biodiversity-friendly crops for sustainable industrial feedstocks and related value chains
- HORIZON-CL6-2022-CIRCBIO-01-05: EU-China international cooperation on unlocking the potential of agricultural residues and wastes for circular and sustainable bio-based solutions
- HORIZON-CL6-2022-CIRCBIO-01-06: Strengthening the European forest-based research and innovation ecosystem
- HORIZON-CL6-2022-CIRCBIO-02-04-two-stage: Photosynthesis revisited: climate emergency, “no pollution and zero-emission” challenge and industrial application
- HORIZON-CL6-2022-CIRCBIO-02-05-two-stage: Life sciences and their convergence with digital technologies for prospecting, understanding and sustainably using biological resources
- HORIZON-CL6-2022-CIRCBIO-02-06-two-stage: Harnessing the digital revolution in the forest-based sector
- HORIZON-CL6-2022-ZEROPOLLUTION-01-01: Preventing groundwater contamination and protecting its quality against harmful impacts of global and climate change
- HORIZON-CL6-2022-ZEROPOLLUTION-01-02: Piloting innovative governance solutions to limit nitrogen and phosphorus emissions at the interface of rural/coastal and urban/industrial environments
- HORIZON-CL6-2022-ZEROPOLLUTION-01-03: EU-China international cooperation on nature-based solutions for nutrient management in agriculture
- HORIZON-CL6-2022-CLIMATE-01-03: Demonstration network on climate-smart farming – boosting the role of advisory services
- HORIZON-CL6-2022-COMMUNITIES-01-03: Integration of marine ecosystem service valuation, conservation and restoration in socio-economic models
- HORIZON-CL6-2022-COMMUNITIES-01-04: Social innovation in food sharing to strengthen urban communities’ food resilience
- HORIZON-CL6-2022-GOVERNANCE-01-15: Developing EU advisory networks on water use

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