



Organic Phosphorus Workshop

July 13-16, 2026

Charlottetown, PE, Canada

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Phosphorus (P) is an essential nutrient for plant growth, and therefore is a key input required in many agroecosystems. With the world population increasing to 9 billion by 2050, the dependence of modern agriculture on P fertilizers makes the availability of P a key issue for global food security. An important subset of total P in soils, water and other environmental samples is organic P, where phosphate groups or P are bonded to carbon (C) groups. Organic P can be a significant proportion of total P in many ecosystems, but the factors controlling its cycling and bioavailability are poorly understood. Past initiatives to consolidate P data have focused on soil test P (phosphate) and often ignore total and/or organic P. This has the potential to greatly underestimate the impacts of P losses on the environment, and the potential for plant utilization.

The overall objective of the Organic Phosphorus Workshop (OPW) is to advance scientific understanding of organic P cycling across ecosystems and translate science into practices and policies that reduce P losses and strengthen food system resilience. This will be achieved by bringing together an internationally diverse group of researchers from across disciplines (soil, hydrology, marine biochemistry, agronomy, microbiology, and policy specialists) and ecosystems (agricultural, forestry, Alpine, marine, freshwater, etc.) to identify innovative pathways for sustainable nutrient management and explore how organic P research can improve nutrient efficiency, soil fertility, crop productivity and water quality.

The OPW is intended to connect research with policy and nutrient governance. The workshop program will focus on: 1) Environmental impacts of organic P on water quality, 2) Organic P and C-nitrogen (N) dynamics, 3) Plant/soil/microbial interactions, 4) Organic P, food security and a changing climate, and 5) Policy: Translating P knowledge into action. Discussions and working groups with international participants will aim to identify shared research priorities and opportunities for joint projects, training and data sharing.

Workshop objectives:

- 1) Advance scientific understanding of organic P cycling and its links to C and N across ecosystems.
- 2) Bring scientists and policymakers together to ensure that organic P is considered in nutrient management.
- 3) Promote interdisciplinary collaboration across soil, hydrology, agronomy, microbiology, marine, biogeochemistry, and policy.
- 4) Define future research directions to sustain collaboration beyond the workshop.



Session 1 - (Hybrid) Policy: Translating P knowledge into action

The opening session will highlight the critical interface between science and policy, exploring how organic P research can inform decision making. By starting with policy perspectives, the session will encourage delegates to consider the science-policy link throughout the workshop. Speakers will highlight perspectives from policy, soil science, and microbiology, followed by a panel discussion to encourage dialogue across the disciplines.

Session 2 – Organic P, food security, and a changing climate

This session will examine the role of organic P in sustaining food systems under the pressures of global climate change. Presentations will address how P cycling in general, and organic P cycling more specifically, are influenced by climate, from arctic tundra ecosystems to agricultural systems, and how new approaches may improve the use of organic P for crop production. Speakers and discussions will highlight how improved management of organic P can support resilient food systems and improve the health of natural ecosystems.

Session 3 – Environmental impacts of organic P on water quality

This session focuses on how organic P affects freshwater and marine systems, with an emphasis on water quality challenges under climate change. Presentations will address processes in lakes, sediments, catchments, and oceans to highlight the influence of organic P on nutrient loading, ecosystem health, and global biogeochemical cycles. Discussions will bring together perspectives from limnology, geochemistry and marine science, linking water quality issues with broader global change impacts.

Session 4 – Plant-soil-microbe interactions with organic P

This session examines the biological processes that regulate organic P turnover and availability across ecosystems. Presentations will explore how plants, microbes and soils interact to mobilize and use organic P, using examples ranging from agricultural management to aquatic systems, to tropical forests. The session will emphasize the role of biological interactions in sustaining nutrient cycles and ecosystem productivity, and will conclude with a panel discussion to integrate knowledge across scales and environments.

Session 5 – Organic P and C-N dynamics

This session will highlight the close connections between organic P, C, and N cycles in soils and aquatic ecosystems. Discussions will examine strategies for improving the use of legacy P (including legacy organic P) in agriculture, the role of soil organic matter in regulating phosphate availability, and how organic P contributes to broader biogeochemical processes. Breakout groups will provide times for participants to share new ideas and will conclude with a policy round table.