

New Research Network to Shed Light on Pollinator Decline

Research on insect pollinators is getting a major boost in support thanks to a newly funded NSERC Strategic Network. The *Canadian Pollination Initiative* (NSERC-CANPOLIN) is a five-year, \$5 million research network designed to investigate the multi-faceted problem of pollinator decline.

Several years in the making, NSERC-CANPOLIN is the first coordinated study of pollination conducted in Canada on a national scale. Led by Peter Kevan at the University of Guelph, the Network has over 45 researchers at 26 institutions across the country. Numerous other scientists, members of the agricultural industry, and representatives from different NGOs were consulted or otherwise participated in CANPOLIN as it evolved from concept to operational research network. At every stage, Network planners met with growing enthusiasm and interest from a range of stakeholders – a reflection of the timeliness of the initiative and the need for a concerted, coordinated research effort on the topic of pollination and pollinator decline.

One of the most unique and valuable aspects of NSERC-CANPOLIN is that it transcends many of the cross-disciplinary barriers that have traditionally hampered pollination research. The Network is comprised of entomologists, plant biologists, ecologists, genomicists, modelers, and economists. Collectively, their expertise represents all major groups of pollinators, the pollination of all groups of plants (including those that are wind pollinated), all types of pollinator habitat, and the various economic and environmental aspects of pollination. The integrated, broad-spectrum approach offered by a network framework is key to addressing the full scope of the pollination problem.

Research activities in NSERC-CANPOLIN fall under four broad themes: *Pollinators*, *Plants*, *Ecosystems*, and *Prediction and Economics*. Each theme has two working groups, and most Network members belong to at least two working groups, demonstrating the truly cross-disciplinary and collaborative nature of the Network.



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Toxomerus geminatus (Syrphidae)

Pollinators

This thematic area is focused on the diversity, taxonomy, conservation and bionomics of native/wild pollinators. Extensive sampling is set to take place across Canada, and a major deliverable of this theme will be a complete inventory of the bees and selected Diptera and Lepidoptera of Canada. The Network will also produce user-friendly, interactive identification guides for all the major pollinating groups of insects. The health and efficiency of managed bees (e.g., honeybees, bumble bees, alfalfa leafcutting bees) will be investigated, with the goal of developing new technologies and management strategies for the suite of diseases now impacting these pollinators. The potential of developing alternative species as commercial pollinators will also be explored. (Theme Leader: Laurence Packer, York University)

Plants

This theme is set to address the lack of data on the sexual reproductive systems of wild Canadian flora and their pollination needs, as well as new and old crops. Such data are needed to properly gauge the role of pollinators in ecosystem functioning and sustainability, and to identify which plants and associated guilds are most at risk from declining pollinators. Additional studies on gene flow will shed light on pollen movement and its role in hybridization and the spread of invasive plants, as well as which conservation and crop pollination strategies are most effective. One group of researchers in this theme will also study pollen production and dispersal in wind pollinated plants, which are a major component of most Canadian ecosystems. (Theme Leaders: Dan Schoen, McGill University, and Kermit Ritland, UBC)

Ecosystems

The Ecosystems theme combines the floral and faunistic studies in an ecological context. Researchers will examine a range of factors affecting plant and pollinator diversity across Canadian ecozones, including habitat loss, fragmentation, competition for pollinators with non-native plants, agricultural and forestry practices, and climate change, and the interactions between these factors. Sampling activities will take place in all major ecozones across the country, in keeping with the national scope of the Network's mandate. Ecozones to be studied include the Arctic, Carolinian Forest, Boreal Forest, St. Lawrence/Great Lakes Forest, Atlantic Maritimes, Tall Grass Prairies, Montane Forest, and the Garry Oak system, among others. The Network will also tackle wider comparisons of ecotones and mixed habitats, such as those dominated by agricultural and urban environments. (Theme Leaders: Elizabeth Elle, SFU, and Jana Vamosi, University of Calgary)

Prediction and Economics

A major goal of the NSERC-CANPOLIN is to predict future management needs regarding the ecological and economic aspects of pollination, particularly as it relates to the effects of climate change and land use change. In this "social impacts" thrust of the Network, state of the art modeling techniques will provide estimates of how ranges and abundance of pollinator species are expected to change over the coming decades, while macroeconomic analyses will highlight the potential economic impacts and provide critical linkages to policy making. (Theme Leaders: Jeremy Kerr, University of Ottawa, and Alfons Weersink, University of Guelph)

In 2002, the International Convention on Biological Diversity identified pollination as a key ecosystem function that is threatened globally. Since that time, public and scientific awareness of the plight of pollinators has only grown, as has recognition of the need for more research. NSERC-CANPOLIN promises to capitalize on the expertise of the Canadian scientific community and make a major contribution towards understanding the extent of pollinator decline and how this essential ecosystem service can be protected and sustained in the face of future global change.

Readers wishing to explore possible involvement with NSERC-CANPOLIN are encouraged to visit www.uoguelph.ca/canpolin or contact Theme Leaders directly.