



The Northern Forestry Centre's Insect Collection

Northern Forestry Centre (NoFC) is home to a large insect (Arthropod) collection, including a pinned collection of approximately 150 000 specimens, 25 000 soft-bodied specimens (such as caterpillars, pupae, etc.) stored in alcohol, and 5 000 microscope slides of smaller organisms. Insects have a three-part body (head, thorax, and abdomen), three pairs of jointed legs, compound eyes, and one pair of antennae. Many, but not all, also have wings. Included in the NoFC insect collection are beetles (Coleoptera), such as the mountain pine beetle (*Dendroctonus ponderosae*), and moths and butterflies (Lepidoptera), such as the gypsy moth (*Lymantria dispar dispar*).



Figure 1. Gypsy moth (*Lymantria dispar dispar*), adult male (wingspan: 35–40 mm). Source: Canadian Forest Service.

Insects represent more than half of all known living organisms; they are the most diverse group of animals on the planet, including more than a million described species. At least two-thirds of all species on the planet are insects. There are approximately 6 to 10 million insect species. We are still discovering and describing new species. Insects can be found in most environments and contribute to Canada's forest ecosystem biodiversity and health. Insects help pollinate trees, shrubs and plants, generating the precious seed needed for the next generation to establish itself and grow. They help consume ailing and aging trees and other plant material, as well as decomposing carcasses of dead animals, thus helping control the spread of diseases and contributing to the regeneration of healthy forest ecosystems. They are also a source of food for many animals, including birds, bats, and fish.

"The collection is made up of specimens collected from forests all over western Canada during the past century", says CFS Insect/Disease Identification Officer Greg Pohl. "Each specimen has detailed information associated with it on what species it is, where and when it was collected, and often what type of tree it was found on and what type of activity it was engaged in. Many of the records are historical vouchers, which are samples of what lived in our forests at previous times. Collected specimens allow us to track changes in distribution, and to verify identifications of old specimens, in light of new species discoveries."



Figure 2. NoFC researcher Greg Pohl holds one of hundreds of cases containing various samples of Arthropods found in western Canada. Source: Greg Pohl.

Most insects go about their daily activities unnoticed, contributing to the well-being of our forests' ecosystems; but there are a few that attract negative attention as pests, such as the mountain pine beetle. Under some conditions, mountain pine beetles can be viewed as beneficial to forests because they attack old and weak pine trees (e.g., ponderosa, lodgepole, jack pine), which speeds up the growth of the next generation of trees. But several years of mild winters and hotter than usual summers, combined with years of fire suppression practices contributed to a massive epidemic that saw unprecedented mountain pine beetle populations affect over 18 million hectares of pine forest.



Figure 3. Mountain pine beetle (*Dendroctonus ponderosae*) adults measure between 3.7 and 7.5 mm long. Source: Canadian Forest Service.

NoFC researchers and this insect collection provide a rich resource for the forest sector; they help identify and understand important forest pests, such as the mountain pine beetle, or spruce budworm (*Choristoneura fumiferana* (Clemens)), in an ongoing effort to comprehend the roles of insects in the world we live in, what makes them behave the way they do, and how we can best manage them when necessary.

For more information on the collection, or to request a visit to the collection or a loan of specimens for scientific research, contact:

Greg Pohl (greg.pohl@canada.ca)

To better understand pest species, and how to distinguish them from non-pests, researchers at the NoFC in Edmonton, Alberta, continually collect, research, verify, and catalogue specimens. Despite this growing wealth of information, entomologists estimate that there are still close to 20,000–30,000 insect species in Canada that have yet to be discovered and described. This estimate is based on the number of new insects discovered each year. "It's a monumental task", says Pohl, "but knowing more about what insect species are out there and how they live will better equip front line inspectors (i.e., Canadian Food Inspection Agency) or those working in rural areas (e.g., foresters, farmers, citizens) to more quickly identify and respond to new and potential threats."



Figure 4. NoFC researcher Greg Pohl examines Arthropods under a microscope. Source: Greg Pohl.