

## Forest disease

Most tree diseases develop insidiously and are not easily recognizable in routine aerial surveys. Chemical spraying techniques are rarely effective in their treatment. The control of forest tree diseases consequently relies heavily on forest management practices. These include early detection and removal of diseased, dying or recently dead trees, careful logging to minimize damage to standing trees and thus prevent or reduce disease entry; and disruption of the life cycle of contaminating organisms by eradicating intermediate hosts.

Canadian research has included the identification, description, life histories and impact of the forest diseases across the country. Intensive work is being conducted on root and butt rots of balsam fir and the spruces in Ontario and Douglas fir in British Columbia; dwarf mistletoes in western Canada; nursery problems such as corky root disease caused by the nematode *Xiphenima bakeri* and Dutch elm disease.

No cure for Dutch elm disease (DED) has yet been found despite 50 years of research in Europe and North America. DED made its first impact in Europe in 1919, in the United States in the 1930s, and in Quebec in 1944. It has killed 65 per cent of the elm population of North America. All varieties of native elm have been affected, but the American or white elm is especially vulnerable.

Canadian scientists at the Laurentian Research Centre are investigating the pathogen and its interaction with the host. Those at the Maritimes Forest Research Centre deal with chemical control of the pathogen using naturally occurring antifungal metabolites and systematic fungicides. They introduce compounds into the trees by soil trenching.

Scientists at the Great Lakes Forest Research Centre have been studying the seasonal history of the beetles that carry the fungus. They first found that the overwintering adult segment of the population that gathers on the lower 2 m of the trunks of living elms is responsible for the transmission and maintenance of *C. vulmi*. A subsequent project tested chemical barriers to control the native elm beetle. The most successful was chlorpyrifos. A single application of chlorpyrifos can exclude the overwintering beetles for two years. For six years the Great Lakes Forest Research Centre has also been using root and root-flare injections of methyl-2-benzimidazole carbamate (MBC-P) into over 1 000 mature elms to prevent or arrest DED. The method has also been used successfully on "heritage" elms.

*Elm ravaged by Dutch elm disease.*

