

## THE FOREST INSECT AND DISEASE SURVEY

Dr. R.G. Taylor, Scientific Adviser for FIDS, has prepared the following account for the Newsletter.

The Forest Insect and Disease Survey (FIDS) of the Canadian Forestry Service is one of the largest and oldest biosurvey groups in Canada. FIDS and its predecessor agencies traditionally have fulfilled the lead role in forest pest surveys for over forty years. Its success within Canada has provided the initial pattern for other units such as the New Zealand Forest Biology Survey.

The early functions of the survey were to identify insects and diseases in the forest, determine their distribution, and gather biological data to explain their life history and habits. Because of the national and international distribution and significance of such organisms, and given the major federal role in forest protection research, a national, decentralized but integrated survey group developed.

The Forest Insect and Disease Survey has not been a static organization since its formation. Several periods of development can be identified as follows.

### 1912-1936

Following the appointment of the first full-time Canadian Government forest entomologist, a number of forest biologists collected and observed forest insects in combination with their research. This number gradually increased, and in 1936 a Forest Insect Survey was established.

### 1937-1945

During this period of slow growth, descriptive circulars were produced for co-operating woods personnel who submitted reports and samples to a few regional centres or to Canadian Forestry Service Headquarters in Ottawa.

### 1946-1953

Regional autonomy increased, and a ranger system of highly trained technical staff was developed to meet, instruct and encourage the co-operation of woods personnel and to augment their collections and observations. Rapid expansion of the faunal survey typified this period.

### 1954-1966

A national co-ordinator was appointed to increase uniformity in basic procedures including a standardized method of recording data with a punch card system. Operation and organization to this date have been described by McGugan (1958). Previous collections had been almost exclusively insect-orientated, but observations and collections of fungi, parasitic plants and abiotic injuries were initiated during this period. Insect and disease monitoring activities were combined under Regional Survey Heads in 1961 to form the Forest Insect and Disease Survey.

### 1967-1978

With more professionals in forest management there was increasing recognition of new and greater information needs. The sampling form was modified and all incoming information, and substantial amounts of older information, were computerized. Although new identification and distribution records were still being received, a reasonably complete inventory and collection of the many insects and diseases in Canadian forests was by now available for reference and

guidance regarding the historical location and the cyclical frequency and duration of outbreaks of many pests.

#### 1979-1982 and beyond

A National task force analysed the traditional functions of the survey and defined national and regional objectives. The survey would:

1. Annually produce a national overview of important pest conditions and their implications;
2. Maintain records and surveys to support federal quarantines involving forest pests;
3. Support forestry research through maintenance of records of pest occurrences and outbreaks, herbaria, insect collections, a national data bank, and making special surveys, collections or observations;
4. Produce, in co-operation with the provinces, a regional or provincial overview of important pest conditions and their implications;
5. Provide advisory services concerning forest insect and disease problems.

Today there are approximately 100 people in the FIDS group making it the single largest agency in the CFS. The staff is located mainly at the six regional centres across Canada in St. John's, Newfoundland; Fredericton, New Brunswick; Quebec City, Quebec; Sault Ste. Marie, Ontario; Edmonton, Alberta; and Victoria, British Columbia. National coordination is provided by a small headquarters staff located in Ottawa, and there are two professional taxonomists with support staff seconded to the Biosystematics Research Institute.

The function of FIDS is broken down into six major areas: 1) detection, monitoring and evaluation; 2) diagnostic/taxonomic services; 3) damage appraisal; 4) special surveys and studies; 5) support to research; and 6) extension. As part of these functions a national data bank of almost two million records of accurately identified forest insect and disease collections has been accumulated along with associated geographical and forest information. Not all of the records apply to major forest pests, but these baseline inventories are essential to support entomological and pathological research, to provide a national perspective of how insect and disease conditions are affecting or are likely to affect the national economy, and as an aid to improve forest management and assist other federal agencies.

FIDS also plays an important role as a quarantine agency. Working in conjunction with Agriculture Canada under the Plant Quarantine Act, FIDS helps to control the import of new forest pests.

With increasing forest management and the magnitude of pest losses indicated by preliminary estimates recently completed, the need for a Forest Insect and Disease Survey is as great or greater now than when it was established. The emphasis, however, has shifted. Accurate diagnosis continues to be essential before any management intervention. However, there is increased emphasis on the development of statistically sound methods of pest population measurement, the predictive relationships between different insect stages, and the interactions of pest species with natural controls. This should improve the basis for predicting population fluctuations, subsequent levels of defoliation or attack, and ultimately the amount of damage.

While detection is obviously a first step, assessment of damage and accurate forecasts of losses are needed for intelligent forest management decisions. As early as 1974 at a national

meeting of survey staff, it was recognized that more critical estimates of timber losses caused by pests were required and that careful long-term monitoring was necessary to identify and measure the relationships between pest population levels and their effects in trees and stands. Computer simulation techniques have expanded greatly, but studies of forest insects must still have a strong biological basis, and measures of the inter-relationships among species are still required. Furthermore, as direct control costs have escalated and social concerns intensified, cost-benefit analyses, which quantify pest losses and impacts, must also be improved.

FIDS produces a number of reports each year including a national overview, regional reports and summaries as well as seasonal highlights and special reports. These of course concentrate on major economic pests but include information on numerous minor pests.

### **References**

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