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BioSIM: OPTIMIZING PEST CONTROL EFFICACY IN FORESTRY

The success of forest pest control programs hinges on the vulnerability of pest populations at the moment we intervene. With insects, weather conditions are the controlling factor. To improve the efficacy of pest control activities, researchers at the Canadian Forest Service's Laurentian Forestry Centre have developed a new software tool, BioSIM, to predict stages in insect development during the growing season.

By linking meteorological data to information on how temperature affects a given species, BioSIM predicts the timing of specific stages in an insect's life cycle (egg, larva, adult). With sufficient information on the pest's biology and local climate conditions, BioSIM can make predictions for specific locations. Moreover, pest development predictions can be mapped for an entire region. The maps can be used in planning forest management activities that optimize pest control methods (prevention and intervention) and use of resources according to the risk level.

Counting spruce budworm on foliage.
Photo: J. Régnière

Once a life cycle simulation model has been developed, BioSIM can be used to predict the development of any pest. Models are currently available for:

- spruce budworm
- gypsy moth
- hemlock looper
- jack pine budworm
- yellow-headed spruce sawfly.

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Collecting spruce budworm on foliage.
Photo: P. Duval

Applications of BioSIM are underway in Canada and the United States. Quebec's ministère des Ressources naturelles (MRN) uses BioSIM to provide foresters with simulations of insect development across the entire province as well as in specific geographical areas.

BioSIM is an indispensable decision support tool for any organization that monitors or manages pest populations, whether in forestry, agriculture or horticulture.

Encouraging Results

In 1999-2000, British Columbia undertook extensive spraying programs against gypsy moth. Spraying times were to be set according to leaf development (when the leaves reached half their full size). However, BioSIM predictions indicated that the caterpillars would not have begun feeding at that time. Without BioSIM, spraying would have begun too soon.

The Canadian Forest Service uses BioSIM to map regions of North America considered more vulnerable.

BioSIM can also be used in applications other than direct pest control. The Canadian Forest Service uses it to map regions of North America considered more vulnerable to the development of gypsy moth populations. It has also been used to predict how climate change can affect the risk of mountain pine beetle infestations in western Canada.

THE TEAM

BioSIM was developed with funding from members of the Spray Efficacy Research Group (SERG), including Forest Protection Limited (FPL), SOPFIM[1], the provincial governments of Quebec, Ontario and British Columbia, and the U.S. Forest Service. These organizations have used BioSIM to control spruce budworm, gypsy moth and yellow-headed spruce sawfly in New Brunswick, Quebec, Ontario, British Columbia and the north-eastern United States.

USEFUL LINKS

BioSIM, Pest Management Planning Decision Support (Canadian Forest Service)
www.nrcan-rncan.gc.ca/cfs-scf/science/technologies/biosim_e.html

Produits spécialisés / BioSIM (Quebec's ministère des Ressources naturelles)
www.mrn.gouv.qc.ca/fimaq/exp/biosim/in_biosim.asp

SOPFIM
www.sopfim.qc.ca

FOR FURTHER INFORMATION, PLEASE CONTACT:

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1 Société de protection des forêts contre les insectes et maladies.

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