

GRANDE PRAIRIE REGIONAL COLLEGE

APPLIED FORESTRY DEGREE PROGRAM

Forest Entomology and Pathology (Forest Health) (FO3080) Course Description

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General introduction, what is forest health?

- Factors contributing to the current high profile of forest health:
 - Forest industry expansion of the 1980's and 1990's has led to:
 - lack of a timber reserve
 - an increasing area of young regenerating stands
 - Imposition of new regeneration standards.
 - Widespread use of Enhanced Forest Management (EFM) practices.
 - Annual Allowable Cut (AAC) implications.
 - Reduced impact of fire.
 - Acceptance by the forest industry of the Forest Care 'Codes of Practice'.
 - Higher profile of forest health in Alta Govt LFS revised 'ground rules'.

Agents which can adversely affect forest health (damage agents)

- Insects
- Fungi
- Flowering plants
- Mammals
- Birds
- Bacteria
- Viruses
- Abiotic

Study of insects as damage agents

- General biology of insects
 - anatomy
 - physiology
 - life cycle, growth
 - ecology, population dynamics

Economically important insects causing damage to forests

- Species affecting:
 - roots
 - stems
 - foliage
 - reproductive biology
- How to recognize insects and how to identify by symptom.
- Impact:
 - mortality (especially in regeneration)
 - loss of height growth
 - volume loss
 - loss of stem and wood quality
 - effect on reproductive biology

Study of fungi as damage agents

- Fungal biology, including
 - structure
 - classification
 - life history

Important fungal damage agents

- Species affecting
 - roots
 - stems
 - foliage
 - reproductive biology
- How to identify by symptom and by fungal characteristics
- Impact:
 - mortality (especially in regeneration)
 - loss of height growth
 - volume loss
 - loss of stem and wood quality
 - effect on reproductive biology

Other pathogens:

- Flowering plants
- Bacteria
- Viruses
- Birds
- Mammals
- Abiotic
 - climate
 - pollution

Surveys to detect and evaluate endemic and epidemic levels of damage agents

- Aerial survey
 - helicopter vs fixed-wing
 - use of Global Positioning System (GPS)
- Ground surveys
 - one-dimensional, two-dimensional, pixel, etc.
- Pheromone traps
- Temporary sample plots and permanent sample plots
- Timing of surveys
- Combining damage agent surveys with other silvicultural surveys
- Aids to surveying
- Efficiencies in surveying

Control of damage agents

- Silvicultural - building control plans into the silvicultural prescription
- Mechanical - of limited use in operational forestry
- Biological - undertake with caution
- Chemical - last resort
- Genetic
- Integrated

Enhanced Forest Management (EFM)

- How various EFM techniques interact with the biology and population dynamics of damage agents
 - thinning, spacing, release from overstorey
 - planting vs seeding
 - fertilizing
 - use of genetically improved stock
 - use of exotics

Ecosystem management

- Forest health vs individual tree health

COURSE OBJECTIVES

The major objectives which I expect students to achieve, are:

- An appreciation of insects and diseases as a part of the natural forest and why, although they have always been present in the natural forest, insects and diseases are particularly important in the 1990's.
- The ability to recognize important forest pests, and/or their symptoms, in the field and the ability to relate particular environmental conditions to the presence, or absence, of specific pests.
- An understanding of the basic concepts of insect and disease management and an appreciation of why good management requires not only a knowledge of the biology of the pest organism, but also involves all aspects of forest science.
- An appreciation of the changing face of forestry in Alberta and its implications for insect and disease management.

RECOMMENDED TEXTS:

Recommended for purchase:

Hiratsuka, Y., Langor, D.W. and P.E. Crane. (1995). *A Field Guide to the Forest Insects and Diseases of the Prairie Provinces*. UBC Press, Vancouver.

Texts available in the library

Coulsen, R.N. and J.A. Witter. (1984). *Forest Entomology: Ecology and Management*. John Wiley & Sons, Toronto.

Knight, F.B. and H.J. Heikkinen. (1980). *Principles of Forest Entomology*, 5th Ed. McGraw-Hill, Toronto.

Compendium of Canadian Forestry Statistics. (1996). Canadian Council of Forestry Ministers.

Periodicals available in the library

Forestry Chronicle

Canadian Journal of Forest Research

Northern Journal of Applied Forestry

EXAMINATIONS

The final, end-of-term, examination will comprise 40% of the total marks.

A mid-term examination will comprise 30% of the total marks.

The remaining 30% will be made up from continuous assessment in the form of quizzes and assignments.