

Chapter 6

Attack on Lodgepole Pines by Fungi, Mistletoe, Adverse Atmospheres, Animals, and Insects¹

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4-1 Introduction

Throughout its life cycle lodgepole pine is subject to a wide variety of adverse influences.

As noted in Section 4-8, extremes of tree internal temperature (colder than -80°C during dormancy or hotter than about 52°C in any season) are deadly. Other temperature-related loss results from frost heaving and red belt damage, the latter a result of intermittent winter arctic air and warmer chinook winds along hillsides (see Section 6-9). Either too much or too little soil moisture can be fatal, as can persistent shading from sunlight (see Section 4-8). Also, soil compaction from heavy vehicular or hooved-animal traffic can significantly slow growth (see Section 5-2). Extreme conditions such as glaciation or sustained submersion under impounded water are obviously fatal.

In addition to these previously discussed adverse influences, there are many other hazards facing the lodgepole pine. For brevity, text in this Chapter omits descriptions of the many insects and diseases common in nurseries and focuses only on those influences with major impact on forest-grown trees in North America.

Amman (1975b) categorized these major influences as follows:

- Understocking. Loss of seed or seedlings may cause understocking and diminution of gross yield.
- Reduction in merchantability. Certain infestations lead to deformed trees which yield less merchantable wood.

- Growth reduction. Defoliation and partial girdling reduce growth and increase the time required for a tree to reach merchantable size.
- Mortality. Mortality reduces yield by reducing the number of live trees; moreover, live trees may be so reduced in number that harvest is unprofitable.

Other overviews of agents injurious to lodgepole pines include Smithers (1961), Hawksworth (1965), Krebill (1975), Amman and Safranyik (1985), van der Kamp and Hawksworth (1985), and Amirault and Pope (1989). Among the destructive agents are numerous fungi, insects, other animals large and small, parasites, fires, air pollution, strong winds, and severe temperatures. Commonly, these forces work together, creating synergistic effects and magnifying damage to lodgepole stands.

Taxonomic nomenclature has changed frequently in the past; common names can frequently serve well to designate an adverse agent but may occasionally include several related species or subspecies. Nomenclature in this text usually follows usage by the source cited; an effort is made, however, to standardize nomenclature according to Harvey *et al.* (1987)—see Table 6-1.

6-2 Root Rots

There are many pests and pathogens which may harm trees in North America. Throughout both Canada and the United States, fungus-caused diseases are especially common (Stewart 1978; Wargo and Shaw 1985), and of these diseases, root rots are among the most destructive.

Fungus Anatomy and Physiology

There are convincing data that stressed lodgepole pines are at a greater risk to root rots than are vigorous trees. Light, nutrient levels, pH, and water

¹This chapter represents a joint effort by the listed authors.

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Abstract: This five-part text describes the several subspecies of lodgepole pine (*Pinus contorta* Loud.) that grow in North America. The first part of the work describes the resource and the species' origin, physiology and silvicultural aspects; a long chapter concluding this first part is concerned with agents that attack lodgepole pine. Part two is concerned with water, forage for livestock, wildlife, and recreation in lodgepole pine forests. Part three characterizes tree parts including foliage, stems, stumps, and roots. Part four describes the processes by which lodgepole pine is converted to products, and part five discusses the major products resulting from such conversion.

Keywords: anatomy, bark, branches, chemical constituents, composites, diseases, drying, energy, fiberboard, flakeboard, foliage, forage, growth and yield, harvesting, insects, lodgepole pine, lumber, machining, mechanical properties, milling, moisture content, particle board, *Pinus contorta* Loud., physiology, preservation, paper, pulp, recreation, regeneration, resource data, roots, silviculture, specific gravity, stumps, treating, utilization, water, wildlife

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LODGEPOLE PINE IN NORTH AMERICA

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