

# True Fir Blights

The information accessed from this screen is based on the publication: Hunt R.S. and Wood C.S. 1978. Common Needle Diseases of Spruce in British Columbia. Forestry Canada, Forest Insect and Disease Survey, Forest Pest Leaflet No. 46 4p.

## Introduction

Needle and shoot blights are caused by a related group of fungi (Ascomycetes), which cause more damage to coniferous foliage in North America than any other group of fungi. Severe infection can result in significant growth reduction. The blights are widely distributed throughout the range of their hosts in British Columbia.

## Hosts and Distribution

There are three species of true fir, *Abies* spp., in the Pacific region: amabilis fir, *Abies amabilis* (Dougl.) Forb., occurs west of the Coast Mountains; alpine fir, *Abies lasiocarpa* (Hook.) Nutt., occurs generally above 1200 m along the Coast (Fig) and is scattered throughout the Interior into the Yukon Territory, and grand fir, *Abies grandis* (Dougl.) Lindl. (Fig), occurs at lower elevations on Vancouver Island and the adjacent mainland coast, inland to the Hope area, and in the southern region of the southwest Kootenays. Some of the many true fir needle and shoot blights also cause damage to Sitka spruce, *Picea sitchensis* (Bong.) Carr., and white spruce, *P. glauca* (Moench) Voss, foliage.

The fungi, their hosts, distribution and symptoms are summarized in Table 1.

## Life History and Recognition

Generally two types of fruiting bodies develop during the life cycle of blight fungi:

1. the "asexual", which occurs like small dots on the upper surface of the needles, e.g., *Lirula punctata*.
2. the "sexual" fruiting body, which is generally large, occurs along the mid-ribs of the lower needle surface e.g., *Lirula punctata*.

The most conspicuous symptoms of needle blights are red, yellow or brown discolored needles (Fig), which may later turn grey. This discoloration is frequently restricted to particular annual increment of foliage (Fig). Discolored infected needles are often intermingled with a few healthy green needles (Fig), unlike frost or drought discoloration, when whole branches or portions of the crown are uniformly discolored.

Each blight has a different life history and many are incompletely known; that of *Isthmiella quadrispora* is presented as an example. Wind disseminated sexual spores infect needles on the newest growth from June until August, and by the following spring, the needles turn red and die. Immature fruiting bodies appear as thin, dark brown lines on the underside of these reddened needles in late summer. The following spring, the infected needles turn pale and tawny; the fruiting bodies become very dark, large and conspicuous, and split open when mature. The sexual spores are wind-borne and can infect only the new needles, thus completing a 2-year life cycle. No asexual spores are produced by this fungus.

## Damage

Only a few of the many blight diseases in British Columbia are known to cause serious damage which is limited to increment loss; tree mortality is not known. Seedlings may be severely damaged if a high percentage of the foliage is infected. Heavily infected trees have an unsightly appearance caused by needle discoloration (Fig).

The degree of damage can be influenced by the age of the host tree; older trees are more resistant to damage and infection of older needles is eventually harmless.

Climatic conditions influence spore dissemination and germination, and thus the frequency and severity of infection. Blights are more common following wet springs. Lower branches and understory trees are frequently the most seriously blighted as the more humid conditions favor infections.

Economic damage caused by the needle blights is conjectural.

## Control

### Biological

Some secondary fungi inhibit the maturation of needle blights and therefore act as natural control agents. These inhibitors vary in abundance and geographic distribution.

### Silvicultural

The establishment and maintenance of vigorous stands will reduce the impact of blights; thinning of dense stands improves air drainage and promotes vigorous growth.

### Chemical

The use of specified foliar fungicides may be effective for forest nurseries and Christmas tree plantations but are not practical under forest conditions.

Table 1. True Fir Blight Fungi in the Pacific Region

Symptoms	Hosts <sup>(1)</sup>	Distribution	Age needles infected	
Bud necrosis	alF, ws	Interior	1 year	<i>Camarosporium strobilinum</i> Bomm., Rouss. & Sacc.

Shoot blight	aF	Interior	1 year	<i>Delphinella abietis</i> (Rostr.) E. Muell. D. balsameae (Waterm.) E. Muell.
Soot-like spots	aF, alF, gf	Interior, Coast	all	<i>Epipolaeum abietis</i> on needles (Dearn.) Shoem.
Brown felt blight on snow-covered needles	aF, alF, wS	Interior	all	<i>Herpotrichia juniperi</i> Coast (Duby) Petr.
Mold on snow-covered needles	alF	Interior	all	<i>Phacidium abietis</i> (Dearn.) Reid & Cain
Discolored needles with longitudinal fungus fruiting structures forming on the needle surface	alF	Interior	2+ years	<i>Isthmiella abietis</i> (Dearn.) Darker
	alF	Interior	2+ years	<i>I. quadrispora</i> Ziller
	aF, alF, gF	Int. & Coast	1+ years	<i>Lirula abietis concoloris</i> (Mayr ex Dearn.) Darker
	aF, alF, gF	Int. & coast	3 years	<i>L. punctata</i> (Darker) Darker
	alF, gF	Int. & coast	2+ years	<i>Lophodermium decorum</i> Darker
	gF	Coast	2 years	<i>L. lacerum</i> Darker
	alF, sS, wS	Int. & coast	2+ years	<i>L. piceae</i> (Fckl.)
	aF, alF	Int. & coast	4+ years	<i>L. uncinatum</i> Darker

	aF	Coast	2+ years	<i>Virgella robusta</i> (Tub.) Darker
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(1) aF = *Abies amabilis*  
 aF = *Abies lasiocarpa*  
 gF = *Abies grandis*

sS = *Picea sitchensis*  
 wS = *Picea glauca*

## Figures

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Figure 237-0018. *Delphinella* sp. tip blight on new foliage of alpine fir.



Figure 240-0092. Needle blight of *Abies grandis* caused by *Isthmiella* sp. New infections cause reddening of foliage, which turns pale brown the following year when fruiting bodies are produced.



Figure 237-0019. *Delphinella* sp. tip blight on new foliage of alpine fir.



Figure 240-0082. Reddening of foliage of alpine fir (*Abies lasiocarpa*) by a new (non-sporulating) infection of *Delphinella balsameae*

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Figure 240-0081. Tip blight of *Abies* caused by *Delphinella balsameae*

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Figure 237-0020. Curled needles and fruit bodies of *Delphinella* sp. on alpine fir.