DECOMPOSITION OF WOOD BY BROWN-ROT FUNGI

BARBARA L. ILLMAN* and TERRY L. HIGHLEY, USDA, Forest Service, Forest Products Laboratory, One Gifford Pinchot Drive, Madison, WI 53705-2398, USA

INTRODUCTION

Many different types of organisms deteriorate wood, but the greatest damage is microbial decay caused by fungi (Figures 1 and 2). Fungal decay is by far the most serious type of damage to wood in use, because it can cause structural failure that, at times, is very rapid. It is virtually impossible to accurately assess the monetary loss caused by decay that destroys wood products or impairs their aesthetic qualities because records are rarely kept. Treatments are available that can either prevent or retard the destructive action of decay. Nevertheless, it is estimated that annual losses of over $1 billion in the United States result from fungal deterioration of untreated or inadequately treated wood.

Broad-spectrum metabolic poisons such as creosote, arsenicals and pentachlorophenol are currently used to protect wood from decay and, in general, are effective when properly applied. However, since the cost effectiveness of these poisons has diminished and since they pose a threat to the environment, there is an urgent need for entirely different approaches to preventing wood deterioration. The unsophisticated approach of using metabolic poisons can only be phased out if new and more selective approaches can be developed. To do so rationally requires that we identify and take advantage of unique physiological features or biochemical systems of the degrading organisms. Identification of the biochemical agents in decay fungi responsible for degradation, either at the site of synthesis, secretion, or at the point of attack within the wood cell wall matrix, can lead to new, sharply targeted and environmentally benign wood preservation methods for controlling decay.
Figure 1. Fruiting Bodies of Wood-Decay Fungi.

Figure 2. Wood Decayed by Brown-Rot Fungi.