SPANISH CEDAR

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SPANISH CEDAR
Cedrela spp.
Family: Meliaceae

By
JEANNETTE M. KRYN, Botanist
Forest Products Laboratory, Forest Service
U. S. Department of Agriculture

Distribution and Habitat

Numerous species of Cedrela occur in every country south of the United States except Chile. The natural range includes moist lowlands along streams, upland rain forests, well-drained hillsides, and drier areas. Variation in the properties and appearance of the woods of the Cedrela species probably depends upon differences in growth conditions, not upon inherent differences between the species.

The principal species of Cedrela are: Cedrela fissilis Vell., C. odorata L., and C. mexicana Roem. The name "cedro," with or without a modifying adjective, is commonly used for all species of Cedrela in the Spanish-speaking countries of South and Central America.

The Tree

Although Spanish cedar or cedro bears the common name and has the cedary fragrance of several North American coniferous trees with needle-like leaves, it is a hardwood belonging to the mahogany family (Meliaceae).

Under favorable conditions of growth in the forest, Spanish cedar may reach a height of 90 to 130 feet and have a trunk diameter of 2 to 4 feet. Prominent buttresses often extend from 4 to 12 feet up the trunk. Clear boles may extend 50 to 80 feet above the buttresses (4, 8).  

1 Maintained at Madison, Wis., in cooperation with the University of Wisconsin.
2 Underlined numbers in parentheses refer to Literature Cited at the end of text.

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The Wood

Freshly cut heartwood is pinkish to reddish brown, but upon exposure it becomes red or dark reddish brown, sometimes with a purplish tinge. It is reported to be darkest when grown in the drier regions. The sapwood is whitish, gray, or pinkish.

The cell structure of Spanish cedar ranges from virtually diffuse-porous to decidedly ring-porous. The texture of the wood is medium, but the darker colored woods frequently are coarser than the lighter colored woods. The grain is commonly straight, sometimes interlocked. A characteristic growth-ring pattern is visible on the tangential surface. The wood has a medium to high luster that is generally lowest in the lighter colored timbers. A cedary odor similar to that of the coniferous "cedars" is usually present. Some specimens taste bitter, others neutral.

Mechanical Properties

Averages of the values obtained for the mechanical properties of several species of Spanish cedar and mahogany are presented in table 1. The average specific gravity of Spanish cedar as determined by various investigators, ranges from 0.36 to 0.41 based on the ovendry weight and the volume of the green wood.

Seasoning and Shrinkage

Spanish cedar is considered easy to season by either air or kiln drying. Surface checking is slight. Shrinkage data for species of Cedrela and mahogany are given in table 2. The British Forest Products Research Laboratory recommends its kiln schedule H (1). The U. S. Forest Products Laboratory schedule that appears most appropriate for 4/4 stock is T10-D4 (12). Some Spanish cedar has been reported to have a tendency to collapse during drying. If stock of this type is encountered, lower temperatures should be used.

A gum-like substance containing a volatile aromatic oil exudes from Spanish cedar. The oil often stains the paper lining in cigar boxes made of this wood, and when it evaporates it leaves a sticky residue that causes boards to adhere. The following curing procedure is suggested (3):

Kiln dry the unsurfaced stock to a moisture content of 6 to 8 percent and then heat it at 200°F. for 8 to 17 hours at a relative humidity of 60 percent. The oils and gums will exude to the rough surfaces, which are then smoothed in the dressing process.

Since the fragrance of cedar is desired in many products made from the wood, any treatment or process that volatilizes the oil and sets the gum must be used with care to prevent excessive volatilization and loss of the fragrance.

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For Spanish cedar the treatment may have to be shortened to keep enough oil in the wood to produce the desired aromatic odor.

Spanish cedar tested at Yale University showed excellent weathering characteristics, comparable to those of mahogany (Swietenia macrophylla King) (13).

**Durability**

Spanish cedar timbers vary in decay resistance. In recent tests, the heartwood of several species of Cedrela was rated from "durable" to "nondurable" in resistance to a white-rot fungus, Polyporus versicolor (L.) Fr. and "durable" to "moderately durable" when exposed to the brown-rot fungus, Poria monticola Murr, (13). Damage by ambrosia beetles is reported to occur, but the wood is said to resist attack by termites (1).

**Working Characteristics**

Spanish cedar is easy to work with both hand and machine tools and takes a smooth finish. It has good gluing, nailholding, and screwholding characteristics and is readily sliced into veneer. The gum in some logs often causes trouble in planing and finishing. Exudations of gum from the wood, even after seasoning, often constitute a serious defect (1, 8).

**Uses**

Spanish cedar is used locally throughout the tropics for exterior and interior construction, furniture and cabinet work, millwork, boat parts, canoes, shingles, sugar casks, and clothing chests. It is adapted for purposes requiring wood that is soft and lightweight, yet strong, straight grained, and easily worked. At one time it was exported to the United States for use in cigar boxes. Its many good qualities make it suitable for patterns, wood novelties, drawing boards, musical instruments, venetian blind slats, decking and planking for small water craft, and rotary veneer for both decorative and utility grades of plywood (4, 8).

**Availability**

Spanish cedar is available, but it is expensive because the trees are widely scattered through forests and there is strong local demand for the timber.

**Identifying Features**

The growth rings are distinct in Spanish cedar because of the distribution of the pores and the presence of concentric bands of marginal parenchyma. The wood may be decidedly ring-porous, with one or several rows of early wood.
pores, semiring-porous, or virtually diffuse-porous, depending upon conditions of growth. The larger pores are readily visible without magnification and are often plugged with dark, gummy deposits. Pores of the late wood are sparse, scattered, solitary, or in short multiples. Marginal parenchyma occurs in narrow, concentric bands and is distinct without magnification. Parenchyma surrounding pores is not abundant. The rays are readily visible with a lens on cross section and form a distinct fleck on radial section. Normal gum ducts are absent, but traumatic vertical ducts may occur in tangential rows.
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(7) Heck, G. E.
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Woods Tested at the Forest Products Laboratory. U. S. Forest
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1928. Tests on Six Argentine Woods.

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1938. Mechanical Properties of Certain Tropical Woods, Chiefly
School of Forestry and Conservation, Ann Arbor, Mich.
(11) Sallenave, P.

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(13) Wangaard, Fred F., and Muschler, Arthur F.
Table 1. -- Mechanical properties of Spanish cedar (Cedrela spp.)¹ and mahogany (Swietenia macrophylla)¹

<table>
<thead>
<tr>
<th>Property</th>
<th>Species</th>
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<tbody>
<tr>
<td></td>
<td>Spanish cedar : Mahogany :</td>
</tr>
<tr>
<td></td>
<td>(Cedrela spp.) : (Swietenia :</td>
</tr>
<tr>
<td></td>
<td>macrophylla)</td>
</tr>
<tr>
<td>Moisture content</td>
<td></td>
</tr>
<tr>
<td>Air dry percent</td>
<td>12 : 12</td>
</tr>
<tr>
<td>Specific gravity</td>
<td></td>
</tr>
<tr>
<td>Based on volume when green and weight when:</td>
<td></td>
</tr>
<tr>
<td>ovendry</td>
<td>0.38 : 0.45</td>
</tr>
<tr>
<td>Static bending</td>
<td></td>
</tr>
<tr>
<td>Fiber stress at proportional limit</td>
<td></td>
</tr>
<tr>
<td>Air dry</td>
<td>7,390 : 7,830</td>
</tr>
<tr>
<td>Modulus of rupture</td>
<td></td>
</tr>
<tr>
<td>Air dry</td>
<td>10,230 : 11,410</td>
</tr>
<tr>
<td>Modulus of elasticity</td>
<td></td>
</tr>
<tr>
<td>Air dry</td>
<td>1,360 : 1,430</td>
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<tr>
<td>Work to maximum load</td>
<td></td>
</tr>
<tr>
<td>Air dry</td>
<td>9.8 : 8.0</td>
</tr>
<tr>
<td>Maximum crushing strength</td>
<td></td>
</tr>
<tr>
<td>Air dry</td>
<td>5,600 : 6,550</td>
</tr>
<tr>
<td>Hardness</td>
<td></td>
</tr>
<tr>
<td>Air dry</td>
<td></td>
</tr>
<tr>
<td>End</td>
<td>830 : 1,030</td>
</tr>
<tr>
<td>Side</td>
<td>570 : 840</td>
</tr>
<tr>
<td>Compression perpendicular to grain -- Stress at proportional limit</td>
<td>Air dry : 690 : 1,040</td>
</tr>
<tr>
<td>Shear</td>
<td></td>
</tr>
<tr>
<td>Air dry</td>
<td>1,140 : 1,330</td>
</tr>
</tbody>
</table>

¹The values for physical and mechanical properties are weighted averages of the average values for the species given by the following sources: Spanish cedar (7, 11, 13); mahogany (2, 5, 7, 10, 13).

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Table 2.--Shrinkage values for Spanish cedar (Cedrela spp.\(^1\)) and mahogany (Swietenia macrophylla)\(^1\)

<table>
<thead>
<tr>
<th>Species</th>
<th>Shrinkage(^2)</th>
<th>Radial: Tangential: Volumetric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish cedar (Cedrela spp.)</td>
<td>4.0 : 6.0 : 9.7</td>
<td></td>
</tr>
<tr>
<td>Mahogany (Swietenia macrophylla)</td>
<td>3.2 : 4.6 : 7.9</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)The shrinkage values are weighted averages of the average values for the various species given by the following sources: Spanish cedar (\(^7\), \(^2\), \(^{11}\), \(^{13}\)); mahogany (\(^2\), \(^6\), \(^7\), \(^{10}\), \(^{13}\)).

\(^2\)Shrinkage values represent shrinkage from the green to the ovendry condition expressed as a percentage of the green dimension.