

Hardwood Lumber and Veneer Series



Elm

FNR-283-W

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EXPERT
REVIEWED

Elm is an interesting and complex group of six species native to the United States, three of which were of significant importance to the lumber industry. Disease has decimated two of these. The wood has a coarse, showy grain pattern, but was used mostly for functional applications.

American elm (*Ulmus Americana* L.), also called soft elm, grey elm, or white elm, was the most common species that developed into large trees. The species ranges from New Brunswick to central Florida then west to central Texas and north to southeastern Saskatchewan and then back east. The largest American elm at 4½ feet above the ground is about 7.35 feet in diameter. Some trees still persist, but by the end of the 1960s this species was decimated by the Dutch Elm disease.

Red elm (*Ulmus rubra* Muhl), also known as slippery elm, was the next most common species and also capable of obtaining large dimensions. The range of this species is similar to American elm but somewhat restricted on the southern, western, and northern edges. The largest red elm reported is 6.6 feet in diameter at 4½ feet above the ground. This species was probably most noted for a mucilaginous inner bark used as food and as a home remedy. This tree too was seriously affected by yet another disease called Elm Yellows (formerly phloem necrosis). This species still persists and some red elm lumber is produced, mostly in the northern states.

Rock or cork elm (*Ulmus thomasi* Sarg.), a third important species, is a somewhat smaller tree but still very significant. The species ranges from



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Dan Cassens and red elm tree

southeastern Ontario to southern Indiana, central Illinois, northern Missouri, north to southeastern Minnesota and back east except for the northern extremes of Wisconsin and Michigan. The largest rock elm reported is 5.36 feet in diameter at 4½ feet above the ground. It is mostly a northern species and sometimes sold separately because of its hardness.

Wood Color and Texture

Elm is a ring porous wood like oak and ash. Thus, it has an open, coarse grain. The grain is often very irregular and wild. On flat sawn surfaces there are also feathery lines between the growth rings. These lines are caused by a unique combination of the latewood pores being tied together with white colored parenchyma cells which are used by the tree for food storage. On flat sawn boards from fast-growth trees, it may appear as if there are several smaller growth rings within one larger one.

Elm is reported to have a straight or interlocked grain pattern. In the author's experience, the grain is commonly interlocked making the wood very difficult to split. Interlocked grain results from the longitudinal cells spiraling slightly in one direction, and then after a few years, they spiral in the opposite direction. As a result, the grain is interlocked and the wood is very hard to split, and the lumber tends not to stay flat when drying.

The color of elm wood can vary substantially. The sapwood is typically white or grayish white. Young trees of American elm tend to have a wide sapwood and a light brown to grayish heartwood. The sapwood darkens due to staining. Red elm typically has a wide heartwood with a very characteristic red brown color.

Workability

With an interlocked grain, most elm is not considered a very good wood for planing, shaping, and turning. Because of its higher density, rock elm may tend to work better.

Strength

At 12 percent moisture content, the average weight of American and red elm is 36 pounds per cubic foot, and rock elm is considerably heavier at 44 pounds per cubic foot. Elms are intermediate in strength.

Steam Bending

Elm is rated as one of the better woods for bending.

Drying

Elm can be dried using a moderate kiln schedule. Because of the interlocked grain pattern, the wood tends to warp badly when dried unless properly stacked and heavily weighted to prevent warping.

Shrinkage

Elm has a moderately high to high shrinkage given its intermediate weight.

Decay Resistance

The elms have no resistant to wood decay.

Commercial Use, Grading, and Value

At one time elm was a very important lumber species. It was used for barrel staves and hoops, but it has now been replaced by other materials. It was also used in vehicles and for handle stock. Another application was in children's wagons and sleds because it would not easily splinter. Other uses include boxes, crates, pallets, agricultural implements, furniture, and paneling. Its ability to bend resulted in its use for bent chair parts. Another application that required bending was for the wood trim on old time steamer trunks. Today, a small quantity of elm lumber is exported, and in most situations where only a few trees are available, it is sold for pallets and blocking.

The National Hardwood Lumber Association grades for lumber are somewhat complicated. The grade category most commonly used is soft elm (grey elm) and includes all elm species except rock elm. The grades of FAS through No. 2B Common and No. 3B Common are graded standard except in No. 2A Common and better lumber, bird peck not over $\frac{3}{8}$ " average diameter are admitted in the cuttings. If the peck exceeds in aggregate $\frac{1}{12}$ of the total area of the required cuttings, the piece is reduced one grade only. Thus, the upper grades are treated as standard except substantial bird peck is allowed.

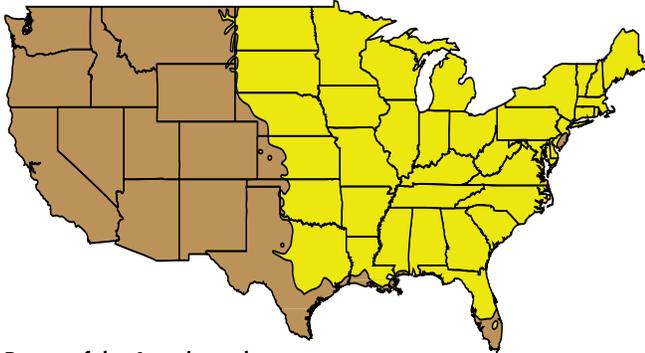
Rock elm is in another species group, and it is graded the same as hickory and pecan. The grades for these three species allow for 4 and 5 inch wide boards (as compared to 6 inch wide boards for the standard grade) in the FAS grade so long as they will yield 11/12 clear face in one cutting as compared to 10/12 for the standard grade. Bird peck is also allowed as described under soft elm.

There is also a grade called Cabinet Rock Elm which is graded standard. This grade is seldom used.

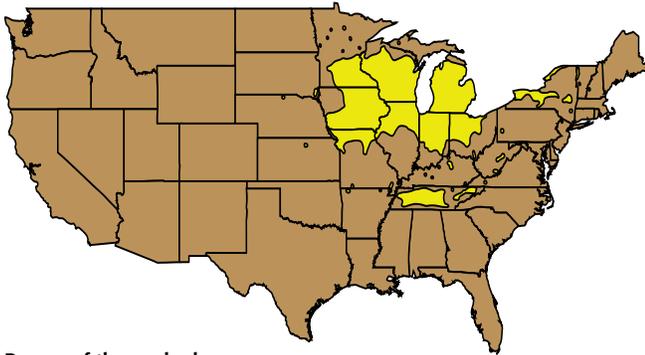
Elm is a very inexpensive wood and only available on a localized basis. Given the scarcity of the wood and the decorative grain pattern, this would seem to

Hardwood Lumber – Elm

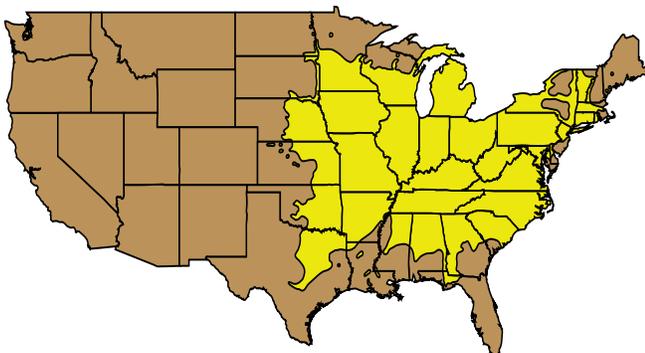
be a species group that could be marketed in small quantities as “different” and “unique” and at a premium.



Range of the American elm



Range of the rock elm



Range of the slippery or red elm



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Elm, once a very common species in the central Midwest is now only sporadically produced as grade lumber. Three commercial species exist, American elm, red elm, and rock elm. All three species can be separated by anatomical properties. Depending on supply and customer preferences, the three species can be mixed and sold together or separated and sold as individual species.

American elm and rock elm appear very similar in the tree and lumber form except that rock elm is heavier and has unique anatomical properties. Red elm lumber is distinct from the others due to its red brown color.

This panel shows several different features of elm. Board 1 is a heavy rock elm; Boards 2, 3, and 5 are American elm.

The heartwood in all four boards is a light tan color, and the sapwood is lighter as seen in the first piece. However, American and rock elm stain easily, and the lumber can be discolored by stain.

Board 1 (rock elm) and Board 3 (American elm) are high quality examples of this species group. Flat sawn elm such as in these two examples will show a distinctive characteristic “U” or “V” shaped ring pattern characteristic of ring porous woods. Also evident in the late wood of these two boards are irregular jagged lines that appear as feathers. This is a unique characteristic of elms and hackberry. Elms exhibit some of the wildest grain patterns of any of our hardwoods.

Board 2 is rift to quarter cut and does not exhibit the wild grain characteristics of the others.

Board 5 is also American elm and shows small spots probably caused by bird peck and some pin and larger knots.

Board 4 and 6 are red elm. Red elm has a darker red brown color than the other two. Board 4 shows a few small pin knots. Board 6 is from the heart of the tree and shows many small pin knots in the center and along its length. Young stems have numerous small branches growing from the main trunk and cause this characteristic.

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