



Extension FactSheet

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Using Local Woodlot Lumber

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Introduction

Ohio's Appalachian hardwoods are unique in their variety, quality, and beauty. Ohio's forests contain well over 100 different hardwoods and 25 different softwood tree species. Historically, humans have used wood and wood products for shelter, fire, and in war, making wood an integral part of our civilization. We use wood because it is easy to work with, inexpensive, durable, and readily available. Early settlers relied heavily on old growth yellow poplar to make barn siding. Old growth yellow poplar made excellent decay resistance siding for log homes due to the naturally occurring tannins in the wood. Yellow poplar boards were easy to hand hue and resisted warp and shrinkage. Today, yellow poplar is still used for siding due to its availability, low cost, paintability, and resistance to warp and shrinkage, as seen in the photo below.

Choosing the Right Wood

Physical and mechanical properties between wood species can vary greatly due to the internal structure of each tree. These include size of cells, thickness of cell walls, and chemical composition. Even trees within the same species will vary due to age, growth rate, site conditions, and internal stress within the tree.

The lumber from each species of wood has characteristics that will determine its adaptability for various uses. Of these,



Home built using yellow poplar lumber milled on a portable sawmill from trees grown on a farm in southern Ohio.

Photo: Courtesy of Gary Haynes.

resistance to decay, ease of working, weight, hardness, color, grain, and resistance to splitting are particularly significant. When selecting lumber for a specific project, consider how the characteristics of the wood species will meet the requirements of the job. For example, joists for a shed should use a wood with good stiffness and bending strength. Since many sheds are not heated, wood with good dimensional stability and the ability to hold nails should also be considered. Once the requirements for the project have been identified, select a wood species with the most appropriate attributes.

Often the job requires wood that is decay resistant. Keep in mind that the heartwood found in the center of the log contains less moisture and higher concentrations of decay resistance chemicals than the younger sapwood. This makes heartwood more appropriate for uses such as fence posts. Young trees have a higher percentage of sapwood than older trees; therefore, small poles and saplings would be almost worthless as posts if used untreated. On the other hand, sapwood, because of its light color, greater flexibility, and lighter weight, is preferred to heartwood for items such as tool handles and siding.

Other Considerations

If you plan to use wood from your own woodland, the trees must be felled, transported to a sawmill, cut into boards, and dried. If you don't have your own sawmill you can hire a portable sawmill to come to your property to saw and stack your lumber. There are also many small sawmills that will do custom orders. Look in your local yellow pages or talk to your local Extension agent or service forester for suggestions. A listing of large and small sawmills by county is available on-line at:

<http://www.oardc.ohio-state.edu/ohiowood>

For many projects, properly air-dried lumber is sufficient. However, wood used in dry, heated environments will either need to be kiln dried or allowed to dry in a similar environment before being used. When air-drying alone, lumber can take several years to get to a 15%–20% moisture content depending on thickness and species. If you don't want to wait or don't have the storage capacity, lumber can be purchased at wholesale prices if you order in bulk, or you can take your lumber to one of several custom dry kilns in the state.

Building codes vary from state to state, county to county, and even from township to township. So before building any structure, check with your local building inspector. If grading rules exist you will need to hire a professional grader to inspect any non-graded lumber or buy graded lumber for load bearing members. If there is no grading requirement, check with your insurance company to make sure you can get homeowner's insurance for your house if it does not use graded lumber. Ideas and building plans can be obtained from the Midwest Plan Service (MPS) and the Northeast Regional Agricultural Engineering Service.

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Lumber milled from Ohio's woodlots are great sources for woodworking and wood frame building needs, as well as many other uses. The species selected depends on the intended use. When considering need, your decision should be based on selecting the species with the most desirable properties for the job. For example, black locust makes great fence post since the heartwood is highly resistant to decay and has good bending strength and excellent nail holding capacity. White oak is an excellent material for water tanks and silos due to its strength and impenetrability to liquids due to a crystalline structure in the wood's membrane called tyloses. Table 1 describes the usual requirements for various building components. Keep in mind

that lumber quality and strength can vary, and it is important to select pieces of lumber that do not have defects which can alter the property of interest.

Although Ohio's forests contain many different species of trees and shrubs, there are only twelve groups of hardwood species that make up the core group of hardwoods grown and sold in North America. These species are commercially important due to the volume in which they occur in the forest and their wide variety of uses. Table 2 outlines the unique characteristics and uses of these species. For help identifying the trees in your woodlot, two excellent references are Ohio State University Extension's *Leaf Identification Key to Eighty-Eight Ohio Trees* and *The Audubon Society Field Guide to North American Trees, Eastern Region*.

Ohio forests and wood lots also contain many other types of hardwoods, each with their own unique traits and uses. These species allow the woodworker or builder to take advantage of interesting colors, grain patterns, and other traits for woodworking or building projects. Table 3 contains a list describing some of the less dense (soft) hardwoods found in Ohio. Sassafras is one of those species. Even though it is very lightweight and soft it is surprisingly decay resistant. Table 4 lists the more dense (hard) Ohio hardwoods. Osage-orange is one of the hardest/densest of American hardwoods and while very difficult to work is easy to dry and is excellent for turning.

Although Ohio's forests are mostly known for their hardwoods, less than 5% of Ohio's forested land contain softwoods. Table 5 describes the four most commonly found softwoods and their uses. Eastern white pine is the most common and is almost always grown in plantations. While Eastern white pine is a very valuable commercial species in most of the Northeast, markets are currently very limited in Ohio, with most logs being converted into paper pulp. Eastern red cedar has some very good local markets and is most often used for outdoor furniture, birdhouses, and cedar chests.

References

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The Audubon Society Field Guide to North American Trees, Eastern Region, by Elbert L. Little, National Audubon Society, Inc., New York, 1993.

Understanding Wood: A Craftsman's Guide to Wood Technology, by R. Bruce Hoadley, The Taunton Press, Inc., Newtown, Connecticut, 2000.

Wood Handbook: Wood as an Engineering Material, USDA Forest Service, Forest Products Laboratory, General Technical Report—113, Madison, Wisconsin, 1999.



Portable sawmills are often used to saw trees into lumber from small woodlots.

Photo: Courtesy of Gary Haynes

Table 1: General Wood Requirements for Common Farm and Home Uses	
Concrete Forms	Good stiffness, easy to nail and cut, resists bending, warping, or splitting during installation and reuse.
Exposed Platforms and Porches	High decay resistance, good stiffness and strength, good wear and splinter resistance.
Feed Racks and Feed Bunks	Hardness and freedom from splitting, medium decay resistance, ease to work.
Fence Posts	High decay resistance and little or no sapwood for untreated posts, good bending strength, straightness, and high nail holding.
Flooring and Steps	Good decay resistance, wear resistant, and resists warping and shrinking.
Framing, Joists, Rafters, etc.	High strength properties in stiffness, hardness, and bending, good nail, screw, and glue holding properties, free of warp and medium weight.
Gates and Fences	Good bending strength, decay resistant, paints well, holds nails, resists weathering, free of warp and splitting, lightweight.
House Trim	For exterior uses look for woods that are decay resistant with good painting and weathering characteristics, is easy to work and resists warping and shrinking, good nail holding ability and easy to work.
Poles and Posts for Pole Barn Construction	High stiffness and strength, free of crook, minimum taper, good nail holding qualities, decay resistance. Pressure treat poles and posts in direct ground contact.
Posts and Beams for Post and Beam Barn Construction	High stiffness and strength, easy to work, moderate weight, and free of crook.
Roof Boards	Good nail or screw holding properties, easy work, low shrinkage, high stiffness and free of warp, free of splits.
Scaffolding	High bending strength, high stiffness, high nail holding, medium weight, and free of compression failures and cross grain.
Shelving	Good stiffness and free of warp with good finishing properties.
Siding	Good paintability, good weathering qualities, is decay resistant and resistant to warp and shrinkage.
Storage Bins, Tanks, Vats, etc.	High decay resistance and low shrinkage.
Studs and Plates	Medium stiffness and strength, good nail holding, medium free of warp, and moderately easy to work.

Table 2: Common Hardwoods				
Species	Uses	Wood Characteristics	Drying	Workability
Ashes	Furniture, handles, boxes, baseball bats, cooperage, boat oars, ladders, chairs, fork and shovel handles, agricultural implements, ship building	Strong, hard, straight, close grained, tough, excellent elastic properties, prone to fungal and beetle attack	Kiln and air-dries easily, dimensionally stable	Easy to work, good nail and screw holding properties, glues and finishes well, excellent steam bending properties
Basswood	Food containers—boxes, tubs, pails and baskets, bee hives and honey sections, slack cooperage, toys and novelties, great for carving	Soft, low strength properties, uniform texture, poor durability—can be treated	Easy to dry, high shrinkage	Easy to work, poor nail holding properties, glues well, easy to carve, poor staining, but holds enamel and paint well
Beech	Food containers, baskets, butcher blocks, chairs, flooring, handles, novelties, woodenware, turnery, clothes pins	Hard, heavy, strong, uniform texture, grain can be interlocked, attractive quarter-sawn, wears well under water	Extra care needed—high shrinkage, prone to warp and splitting	Difficult to work with hand tools, machines well, hard to nail, prone to split, holds nails and screws well, good finishing properties, can be steam bent
Birches	Flooring, furniture, door, cabinetry woodenware, butcher blocks, firewood. Traditionally—(sweet birch sap) birch beer	Wavy grained, strong, poor durability, high impact resistance	Dries slowly, high shrinkage	Machines and finishes very well, holds nails and screws well Yellow birch—bends well, extra care is needed for gluing Sweet birch—good for turning, tends to split
Cherry	Cabinetry, furniture, tool handles, novelties, musical instruments, woodenware	Excellent strength properties, attractive quarter-sawn, poor durability	Dries easily, weigh down to avoid warp	Easy to work, machine and turn, holds screws and glue well, finishes very well, turns darker with age
Hickories	Best wood for handles—axes, hammers, ladder rungs, golf clubs, agricultural parts, archery bows Traditionally—spokes, wheel rims and buggy shafts	Hard, heavy, strong, excellent elasticity	Prone to split, check & warp, high shrinkage	Excellent workability with sharp tools, prone to split, finishes very smoothly, excellent bending properties
Sugar Maple (Hard Maple)	Furniture, paneling and cabinetry, flooring, wood with figure prized for decorative cabinetry and musical instruments, turning	Poor durability, very strong, very hard	High shrinkage, prone to blue stain, sticker quickly and allow good airflow	Machines and finishes well, good glue, nail, and screw holding properties, prone to splitting, excellent bending properties
Red Maple (Soft Maple)	Turned articles, kitchen utensils, toys, novelties, crating, pallets, inexpensive cabinets	Poor durability, strong, hard	Prone to blue stain, sticker quickly and allow good airflow	Easy to work, turns and finishes well
Red Oaks	Cabinetry, furniture, veneer, flooring, millwork, pallets	Strong, poor durability	Dries fast, end coat to avoid checking	Machines well, can be steam bent
White Oaks	Fine cabinetry, millwork, flooring, ships, heavy construction, bridges, liquor barrels and other containers	Very durable, attractive quarter-sawn, very strong, impermeable to liquid, hard with straight grain	Dries slowly, prone to checks and splits, high shrinkage	Machines well, tannic acid causes discoloration so avoid metals containing iron fasteners
Yellow-Poplar	Furniture, cabinetwork, sash, doors, shelving, boxes, crates, baskets, pallets, veneer, woodenware, carving	Lightweight, weak, brittle, moderately strong	Easy to dry, dimensionally stable	Easy to work, very paintable, nails easily, but holds nails poorly, glues well
Walnut	Cabinetwork, gunstocks, furniture, novelties, molding	Strong, lightweight, figured grain, absorbs recoil	Dries slowly, very stable	Easy to work, good nail and screw holding properties, finishes well with filling

Table 3: Soft Hardwoods				
Species	Uses	Wood Characteristics	Drying	Workability
Ailanthus (tree-of-heaven)	Woodworking, fuel	Light, weak, reputed to resist insects, but not fungi, attractive quarter-sawn	Easy to dry	Easy to tool, glue, and finish
Aspen	Furniture, interior trim, pallets, boxes, crates	Low strength, high resistance to wear, light, poor durability	Dries satisfactory	Easy to work, surfaces tend to be “woolly,” good nail holding properties
Black Ash	Excellent for cabinetry and steam bending, interior trim, chairs, tables, other furniture, basket weaving	Weaker than white ash, low abrasion resistance, very poor durability, showy figure	Easy to air dry	Easy to work and glue, prone to split, finishes well with clear varnish—fill for smooth surface
Black Willow	Millwork, furniture, cases, boxes, picture frames, Venetian blinds	Very light, interlocked grain, poor durability	Extra care needed—prone to warp	Very difficult to machine, glues and finishes well, carves well
Box Elder	Furniture, boxes/crates, charcoal, cooperage, woodenware, woodworking (wood stained red by fungus)	Light, weak, decays rapidly	Dries quickly without degrade or checking	Easy to work
Butternut	Furniture, interior trim, paneling, and craving Traditionally—church altars	Weak bending and compression strength	Easy to dry, low shrinkage	Easy to work with sharp cutting edge, finishes well
Cottonwood	Boxes/crates, packing cases, shavings, inexpensive furniture parts, poultry cages and bee hive sections, kitchen cabinets, food pails, butter tubs, posts, poles	Tough, strong, poor durability without treatment	Extra care needed—prone to warp	Easy to work, takes stencil ink well, poor nail and screw holding properties, glues and paints well
Hackberry	Woodworking, carving, farm implements, boxes, crates	Heavy, weak, decays readily when exposed	Difficult to dry	Easy to work, stain, and finish
Mulberry	Fence post, excellent for furniture when properly cut and dried	Light but very durable	Easy to dry	Easy to work, prone to splits, screws and glues well
Ohio Buckeye	Woodenware, occasionally lumber, fuel, woodworking (wood stained with gray streaks)	Light, for its weight strong and tough, decays rapidly when exposed	Easy to dry	Easy to work, difficult to split, finishes smooth, good paintability
Sassafras	Woodworking, fences, house sills, furniture, boxes, and slack cooperage, (inner bark) candies and tea Traditionally—ox yokes, (inner bark) dye	Light, brittle, very durable	Dries very easily, prone to checks	Easily worked and finished, extra care needed—for nails, holds screws and glue well, dimensionally stable

Table 4: Hard Hardwoods				
Species	Uses	Wood Characteristics	Drying	Workability
American Hornbeam (ironwood)	Items requiring heft and strength—mallets, tool handles, wedges, and other small items, small craft items, turnery	Extremely dense and smooth, poor durability	Extra care needed—prone to warp	Extra care is needed for gluing, easy to finish
Black Tupelo (blackgum)	Boxes, crates, basket veneers, flooring, rollers, mallets, ties, cigar boxes, caskets, sashes, doors, blocks, gunstocks, bowls, furniture Traditionally—ox yokes	Very tough, interlocked grained, without luster, poor durability (can be treated)	Extra care needed—prone to warp	Difficult to split and nail, dulls tools, glues well, good finish
Common Persimmon	Turnery, golf club heads, shuttle blocks, bobbins, shoe lasts, handles, spools	Heavy, strong, heartwood is highly decay resistant	Difficult to dry	Difficult to work, finishes to high polish, poor gluing, good nail holding, good shock and wear resistance
Eastern Hophornbeam	Carving, turnings, excellent firewood Traditionally—splitting wedges, tool handles, mallet heads, wagon axles	Heavy, very strong, excellent abrasion resistance, very dense	Very slow to dry	Difficult to cut or plane, drilling pilot holes is necessary to nail or screw
Elm	Cooperage stays, hoops, baskets, shipbuilding, boxes, crates, flooring, veneers, toys, woodenware, furniture	Heavy, tough, attractive quarter-sawn	Extra care needed—prone to warp	Difficult to split, excellent bending properties, hard to polish, sawn surfaces can be “woolly,” dulls tools, nails, screws and finishes well
Kentucky Coffeetree	Fence posts, furniture, ties, construction material, poles Traditionally—(roasted seeds) coffee substitute	Durable, heavy, tough, strong, coarse grained	Difficult to dry without splitting	Easy to work, glues and finishes well, holds nails and screws, prone to splits
Locust, Black	Fence posts, handles, boxes, ship construction, crates, woodenware, poles, novelties Traditionally—wagon wheel hubs	Very hard, strong, heavy and heartwood durable	Dries slowly, prone to warp	Difficult to work with hand tools, machines well, very smooth finish, high polish, hard to nail
Osage-orange	Superior fence posts and ties, musical instruments, turnery and novelties Traditionally—wagon wheels hubs, Native Americans—bows, war clubs	Very hard, heavy, tough and resilient, most durable of all North American species	Dries well	Difficult to work, dulls tools, difficult to nail, holds screws well, glues easily, avoid finishing with oils
Sourwood	Turnery, handles, machine bearing Traditionally—sled runners	Heavy, excellent wear resistance, very close grained, poor durability	Prone to warp	Easy to work, glues satisfactorily, sands and finishes well
Sweet Gum	Furniture, interior finishing, boxes/crates, woodworking—beautiful figured grain, prized in Europe	Strong, stiff, interlocked grain, poor durability	High shrinkage, thin stock prone to warp	Very easy to work, plane and sand, holds nails and screws well, satisfactorily gluing, poor steam bending
Sycamore	Butcher blocks, boxes, crates, truck slats, brush backs, slack cooperage, furniture, fruit and vegetable baskets, interior finish, woodenware	Moderately strong, decays rapidly when exposed, attractive ray flecks when quarter-sawn	Extra care needed—prone to warp	Turns with ease, finishes smooth with sharp tools, nails, screws, and glues well

Table 5: Common Softwoods				
Species	Uses	Wood Characteristics	Drying	Workability
Eastern Red Cedar	Chest linings, interior woodwork, souvenir novelties, buckets, shingles, small boats, posts and poles, (leaf oil) medicine, (wood oil) perfume Traditionally — pencils	Highly aromatic, heartwood durable	Easy to dry, low shrinkage	Easy to work, carves and whittles well
Eastern White Pine	Millwork, sashes, panel doors, interior trim and paneling, log homes, cabinetry, furniture, match sticks, pattern making, general construction, roof boards, sheathing, crating Traditionally — war ship masts, (needles) tea to prevent scurvy	Softest and lightest of the pines, weak, poor durability, low abrasion resistance	Quick and easy to air dry, low shrinkage, prone to blue stain, sticker quickly and provide good airflow	Very easy to work, planes well, glues easily, accepts fasteners, dimensionally stable, stains well, good for carving, poor for turning
Shortleaf Pine	Interior and exterior finishing, general construction, veneer, packing shavings, cooperage, mine props	Pines in the Southern yellow pine group are good for general construction with high strength properties, durable when treated		Moderately easy to work, hard to nail
Virginia Pine	Rough construction Treated — posts, poles, pilings		Prone to warp with alternate wetting and drying	Moderately easy to work, hard to nail, knotty

Adapted from: *Native Species for Home and Farm Use*, “Forestry and Forest Industry Facts,” F-19, by Gregory R. Passewitz and Stephen M. Bratkovich, Ohio State University Extension, 1987.

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